Supplementary Information

Network Interventions for Changing Physical Activity Behavior in Preadolescents

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This PDF file includes:

Supplementary Figures

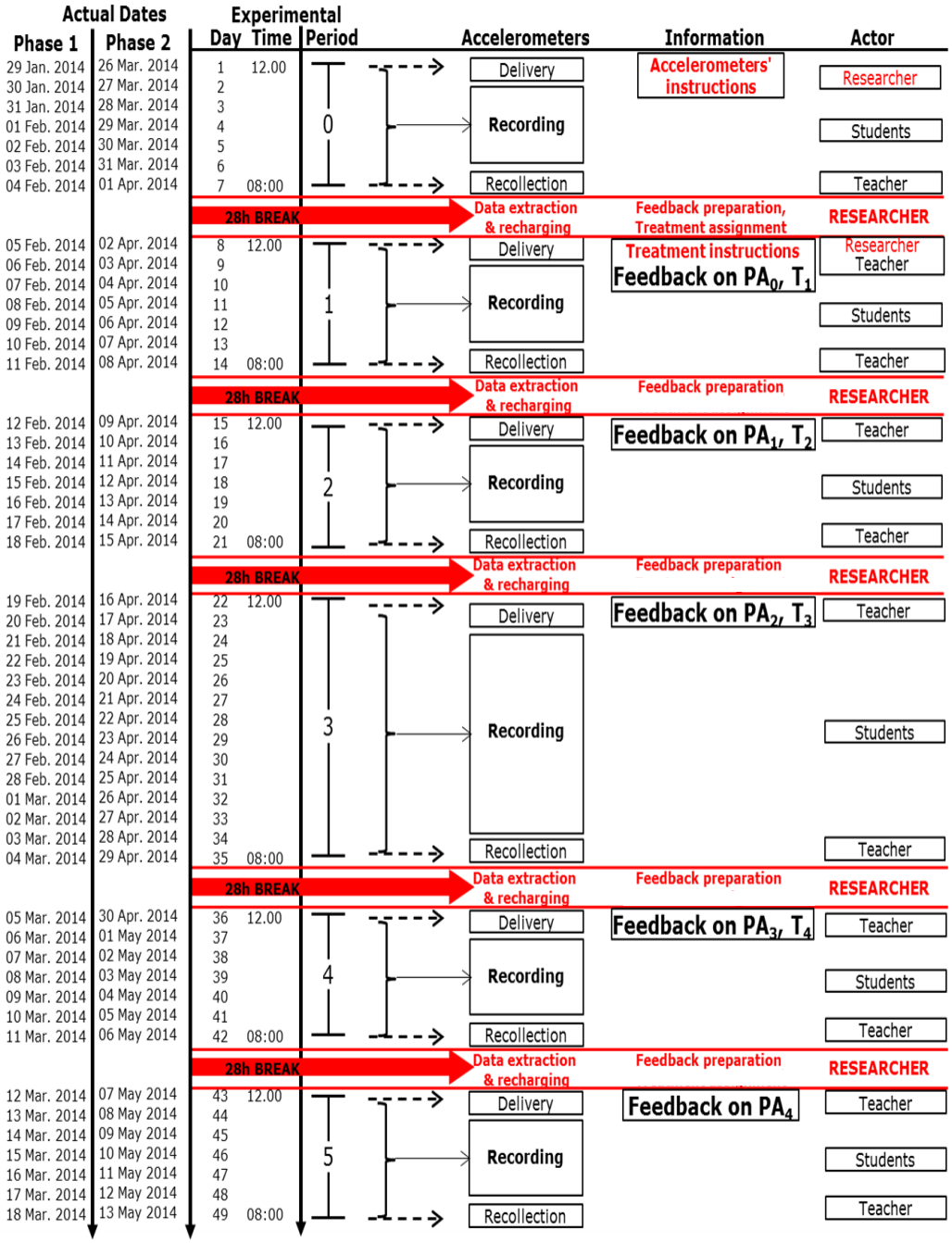


Fig. S1. Timeline including dates, accelerometers' and information flow. Accelerometer flow includes four actions: delivery, recollection, recharging, and data extraction. Information flow is divided into: a) non-repeated information including accelerometers' (in p_0) and treatment's instructions (in p_1) and b) repeated information for all $p_{t\geq1}$ including individuals' feedback on their physical activity performance in p_{t-1} (PA_{t-1}) and on the current thresholds (T_t) for their final classification in p_t. The entire experiment lasted for 7 weeks divided into 6 periods: four 1-week (p_0,p_1,p_2 and p_4), one 2-weeks (p_3) period (-28hrs. for data-extraction) and the post-experimental period p_5, in which students performance was recorded but no incentives or bonus have been provided.

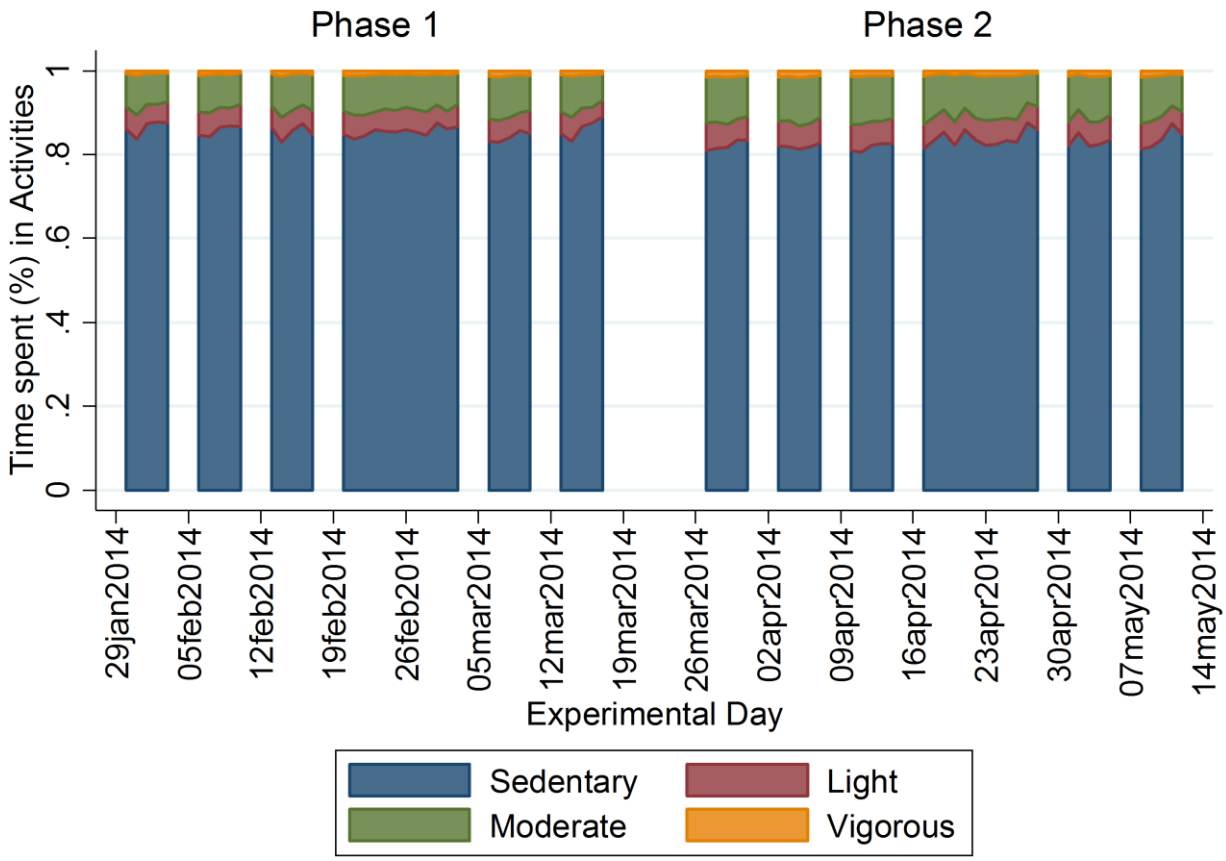


Fig. S2: Alternative Activity-Time Classification (Freedson for children[49]). Cut-points identified by Freedson and colleagues[49,50] were used to classify time spent sedentary (≤149 cpm), or in light (150 - 499 cpm), moderate (500-3999 cpm), vigorous (≥4000, and very vigorous ≥ 7600)

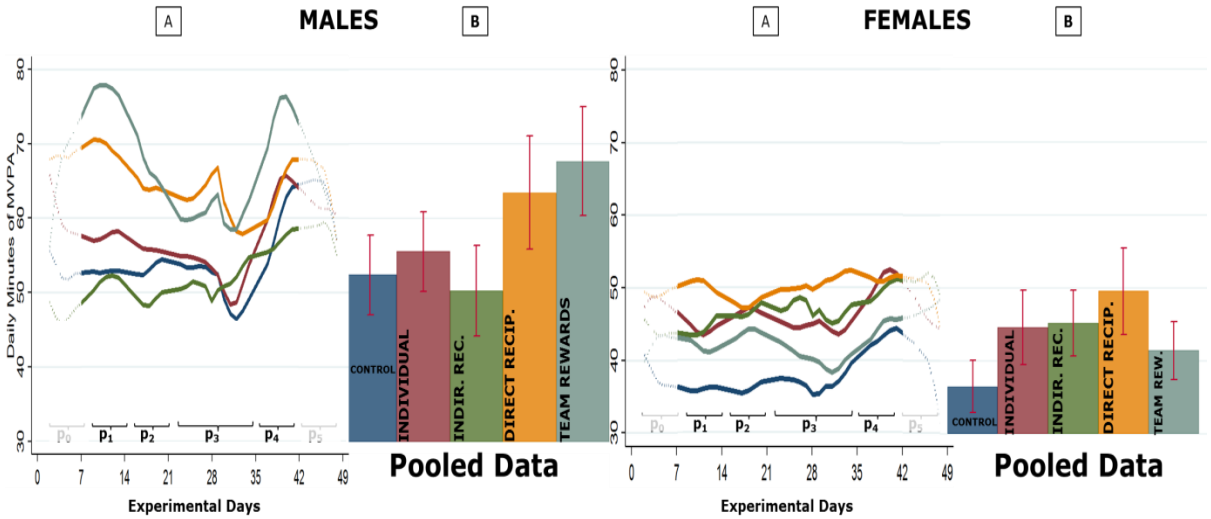


Fig. S3: Average daily minutes of Moderate to Vigorous Physical Activity (MVPA) by experimental condition and sex. (A) Locally weighted estimations of MVPA on experimental days (pooled data form both experimental phases). Dotted lines correspond to no-incentivized periods. (B) Pooled data from all experimental periods (p_1-p_5) with 95% confidence interval error bars. (A-B) Data is weighted according to the number of observations in each subsample after having assigned equal weights for both experimental phases.

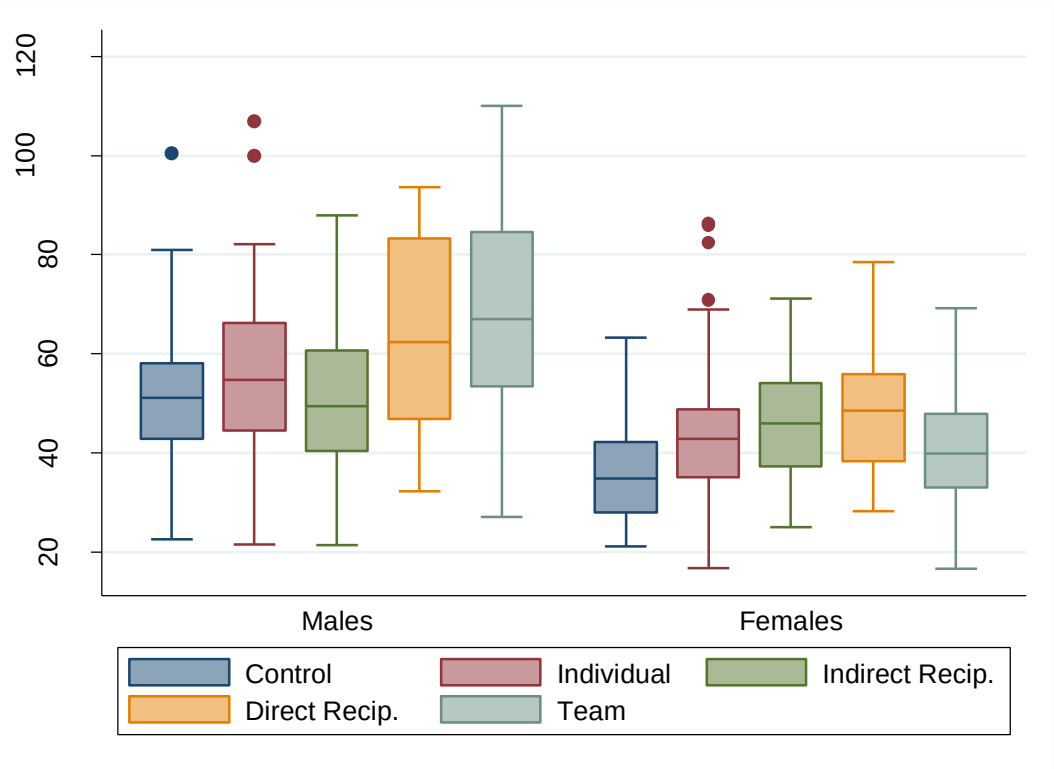


Fig. S4: Box-plots of daily minutes moderate to vigorous physical activity (MVPA) by experimental condition. Pooled data from all experimental periods (p_1-p_5).

PEER-ACTIVE: "Il ruolo degli incentivi individuali e sociali per migliorare l'attività fisica nei bambini in età scolare: uno studio nelle scuole".

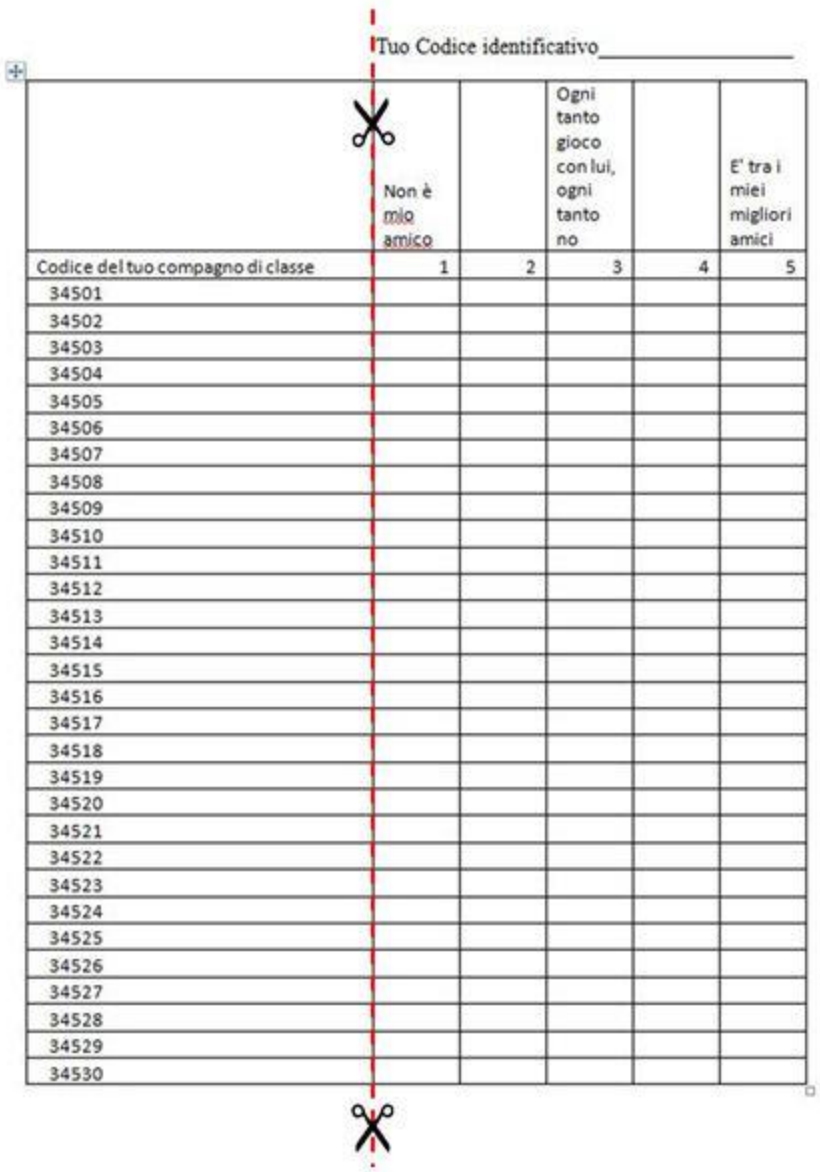
Egregi Genitori,
L'Istituto per la Salute e la Protezione dei Consumatori del JRC di Ispra sta lavorando ad un progetto di ricerca il cui obiettivo è di valutare l'effetto degli incentivi individuali e collettivi sull'attività fisica dei bambini di età compresa tra i 9 e gli 11 anni. Studi recenti hanno dimostrato che negli adulti il contesto sociale può migliorare in maniera significativa l'attività fisica condotta, e che l'età scolare è un periodo critico per la formazione di corrette abitudini legate alla dieta e all'attività fisica.
Sulla base del protocollo stabilito, ai bambini verrà chiesto di indossare dei misuratori di attività fisica durante l'arco della giornata ("accelerometri", dimensioni : 4 cm x 4 cm x 2 cm; peso: 27 gr; da indossare tramite un cinturino alla vita) che permetteranno ai ricercatori di valutare l'attività fisica giornaliera e di trasformare questi dati in punti. I bambini indosseranno l'accelerometro per un totale di 3 o 7 settimane. I punti potranno essere assegnati sulla base all'attività fisica del bambino stesso, di un suo compagno, del gruppo o casuale. La tipologia di assegnazione avverrà per estrazione e sarà identica per tutti i bambini di una stessa classe. Il punteggio verrà aggiornato settimanalmente e i punti accumulati potranno essere scambiati con premi di relativo valore (attrezzatura e/o abbigliamento sportivo). Ogni bambino (con il consenso dei genitori) potrà scegliere un premio a scelta tra quelli elencati in una lista a disposizione nella classe. Prima di iniziare lo studio verrà chiesto ai genitori di compilare un breve questionario con alcune informazioni relative al bambino (età, altezza, peso, sesso etc.), mentre ai bambini si richiederà di descrivere le proprie amicizie all'interno della classe.
Gli accelerometri e i questionari verranno consegnati da un/una insegnate e i dati raccolti verranno trattati in maniera anonima e utilizzati a solo scopo di ricerca. Ai genitori verrà offerta la possibilità di ricevere una copia finale dell'attività fisica registrata durante il corso dello studio. La partecipazione allo studio è volontaria e i bambini/genitori potranno terminare la loro partecipazione in qualunque momento senza addurre alcuna motivazione.

Si ringrazia della collaborazione,

Dott. Antonios Proestakis, Dott.ssa Eugenia Polizzi- CCR- Ispra

Fig. S5: Information letter to the parents/childrens' carers about the Peer-Active Project. Parents/children's carers signed informed consent on behalf of the children in the back side of this letter and returned to the researchers.

Translation: Dear Parents, The JRC Institute for Health and Consumer Protection is working on a research project aimed at assessing the effect of individual and collective incentives on 9-11 years old children physical activity. Recent studies on adults have shown that the social context can significantly improve physical activity, and that school age is a critical period for the formation of correct habits related to diet and physical activity. Based on an established protocol, children will be asked to wear physical activity meters during the day ("accelerometers", dimensions: 4 cm x 4 cm x 2 cm, weight: 27 g, to be worn with a strap) that will allow researchers to evaluate daily physical activity and turn these data into points. Children will wear the accelerometer for a total of 7 weeks. The points can be assigned on the basis of the physical activity of the child, of one of his teammates, of the group or random. The type of assignment will take place randomly and will be identical for all children of the same class. The score will be updated weekly and the points accumulated will be exchanged for prizes of relative value (equipment and / or sportswear). Each child (with the consent of the parents) will be able to choose a prize of his/her choice among those listed in a list available in the class. Before starting the study, parents will be asked to fill in a short questionnaire with some information about the child (age, height, weight, sex, etc.), while children will be asked to describe their friendships within the class. Accelerometers and questionnaires will be delivered by a teacher and the data collected will be treated anonymously and used for research purposes only. Parents will be offered the opportunity to receive a final copy of the physical activity recorded during the course of the study. Participation in the study is voluntary and the children / parents can stop their participation at any time without giving any reason.



Tuo Codice identificativo_____

Codice del tuo compagno di classe	Non è mio amico		Ogni tanto gioco con lui, ogni tanto no		E' tra i miei migliori amici
	1	2	3	4	5
34501					
34502					
34503					
34504					
34505					
34506					
34507					
34508					
34509					
34510					
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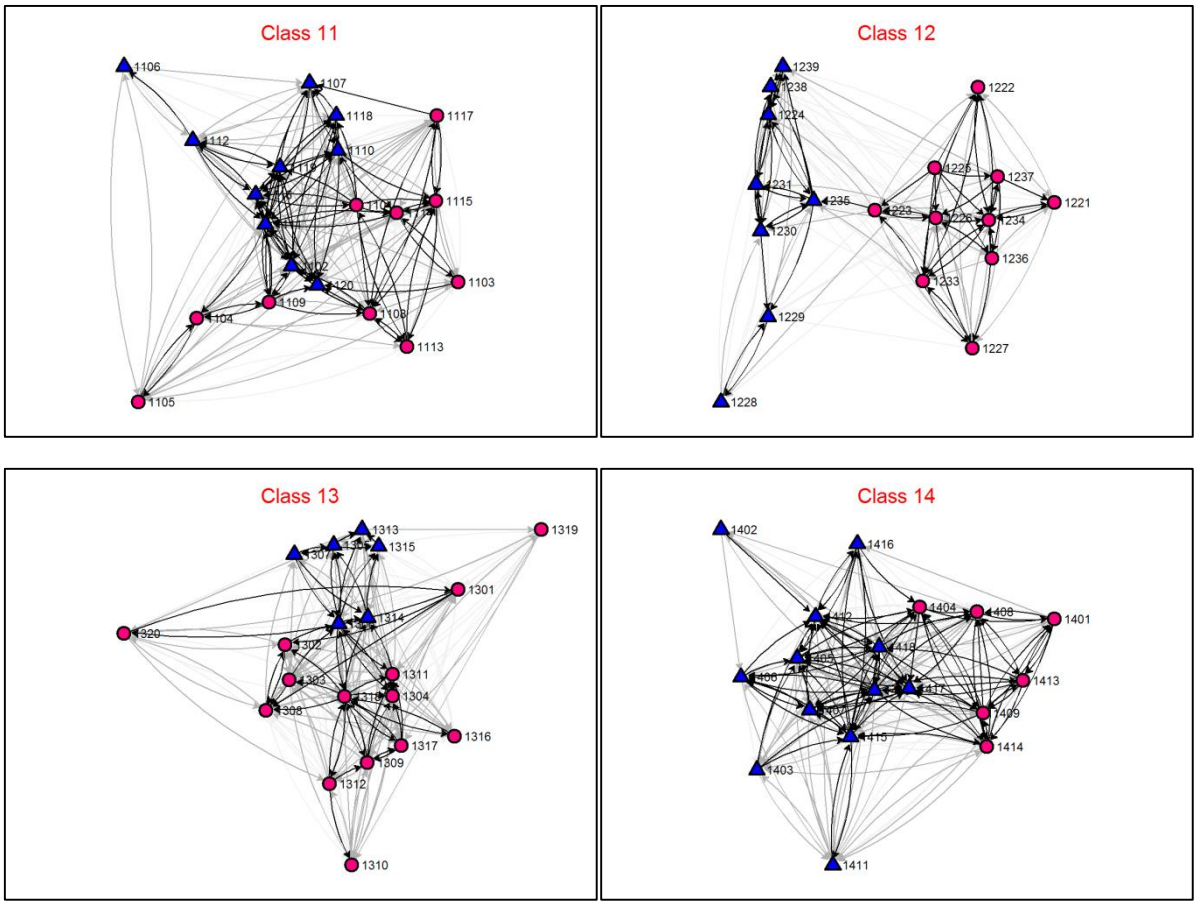
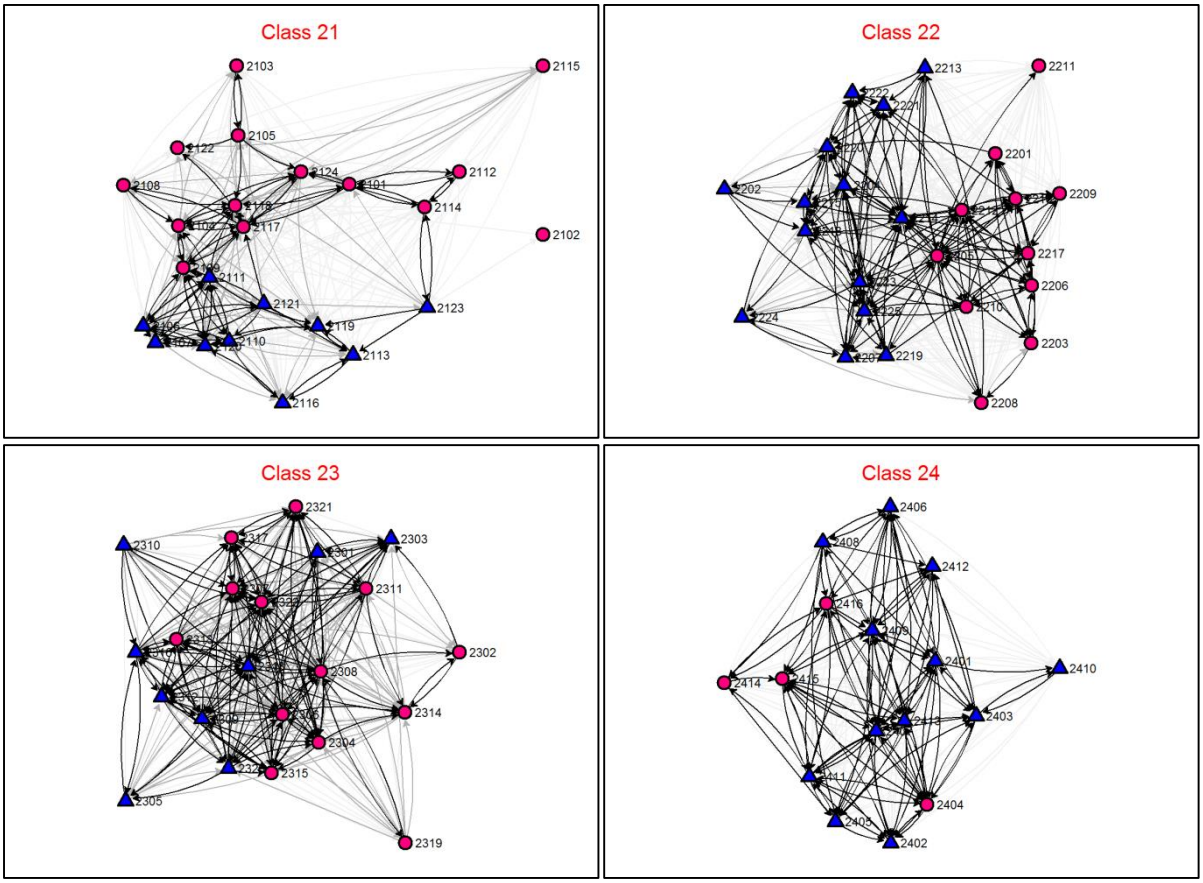
Fig. S6: Questionnaire for eliciting students' friendships with their classmates. Teachers made the correspondence between codes and students and instructed students how to fill in the questionnaire.

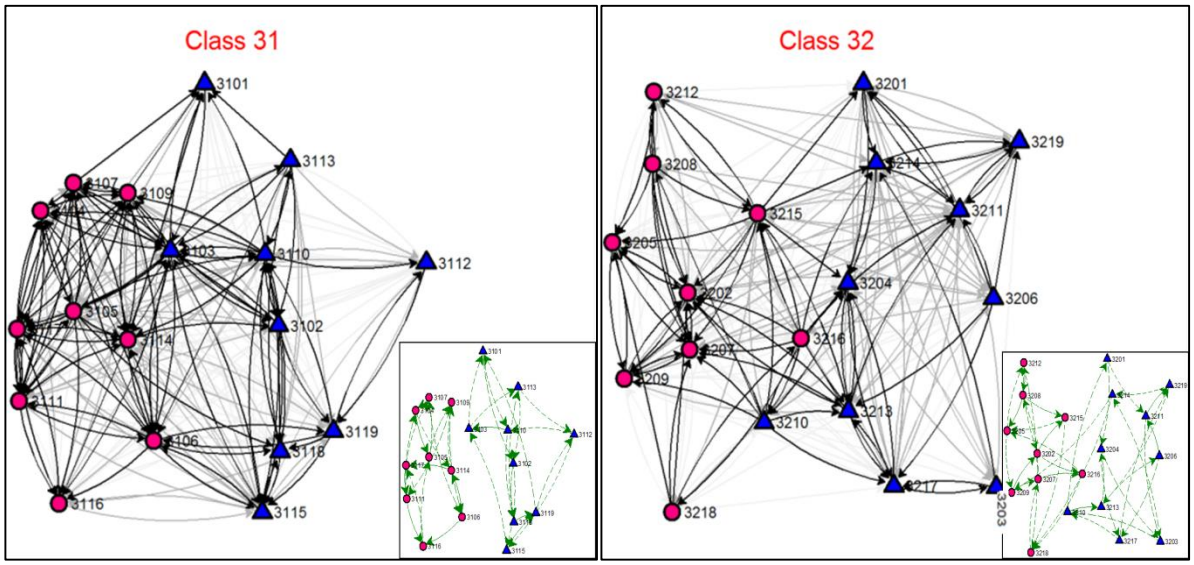
NETWORKS IN THE CONTROL CONDITION

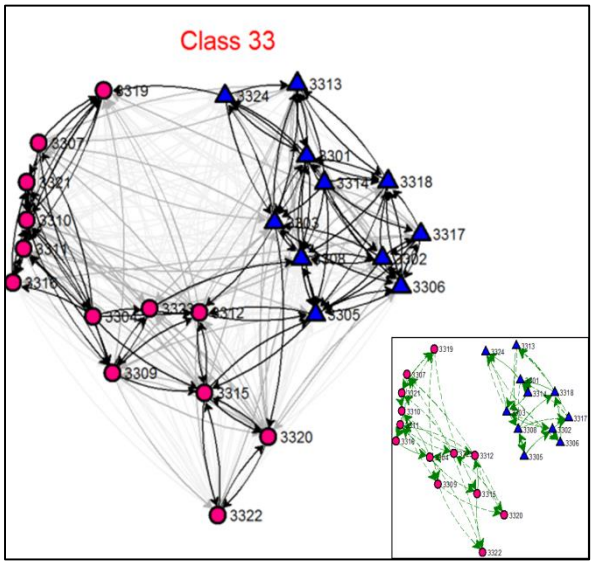


NETWORKS IN THE INDIVIDUAL CONDITION



NETWORKS IN THE INDIRECT RECIPROCITY CONDITION





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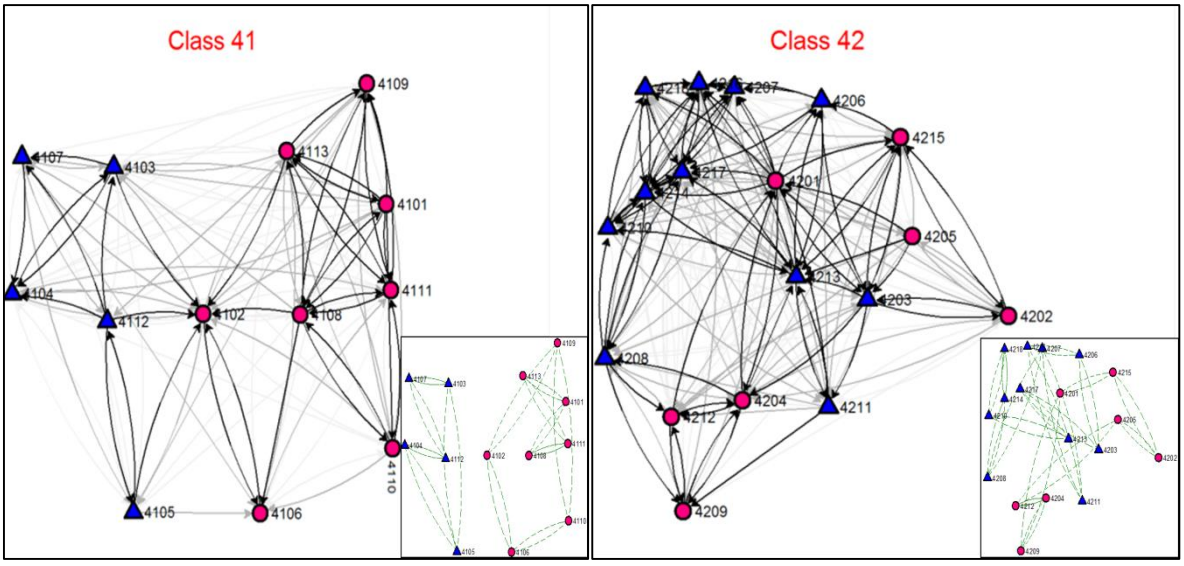
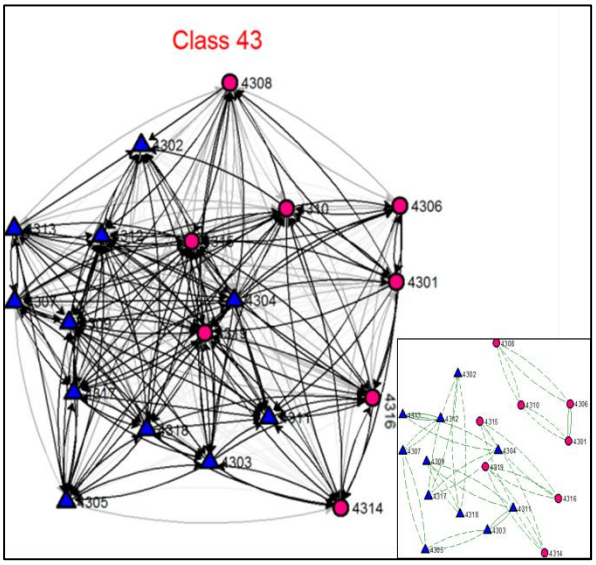
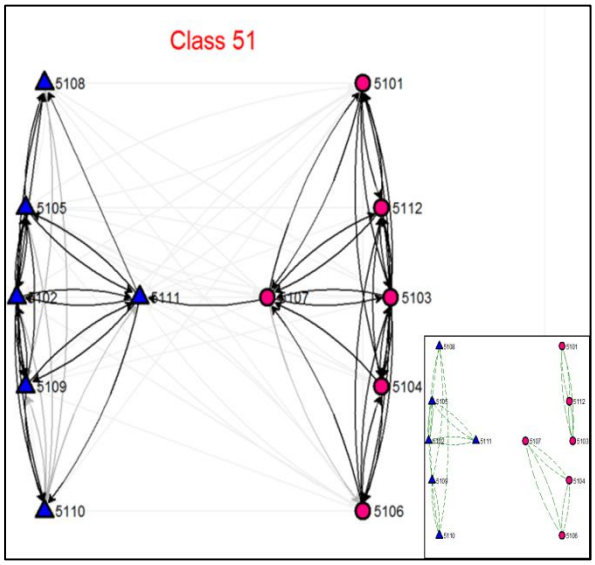
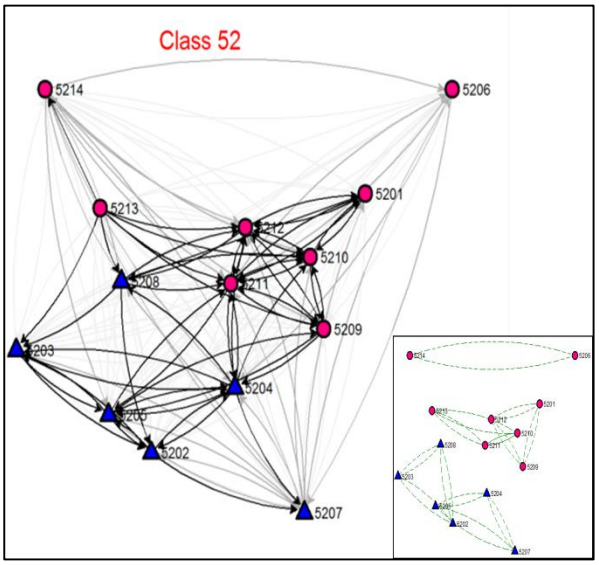
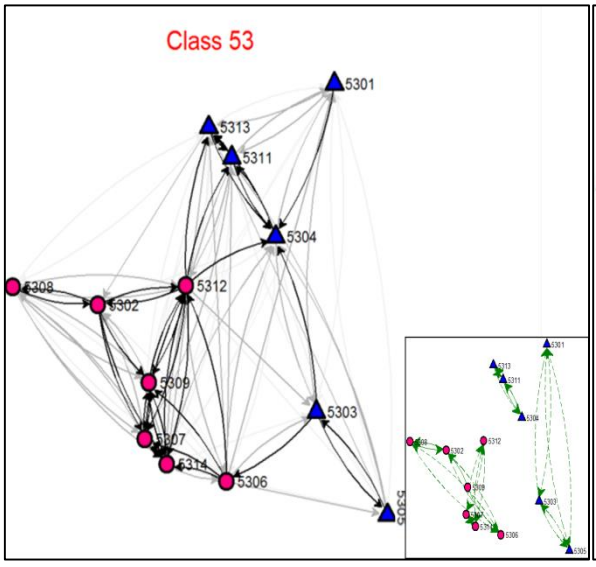


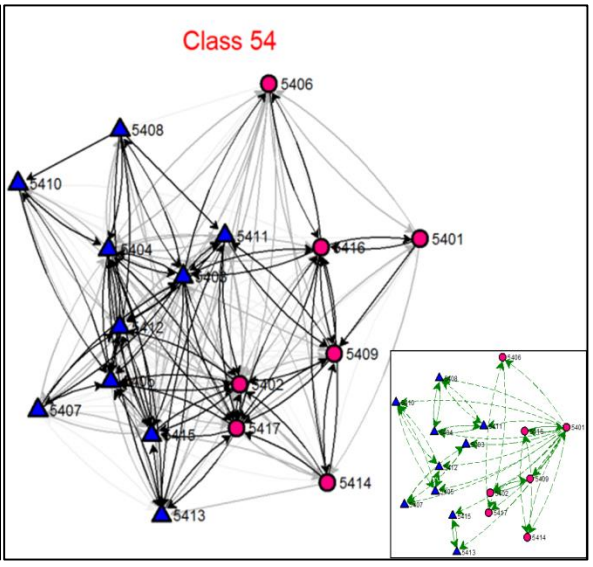


NETWORKS IN THE TEAM-REWARDS CONDITION









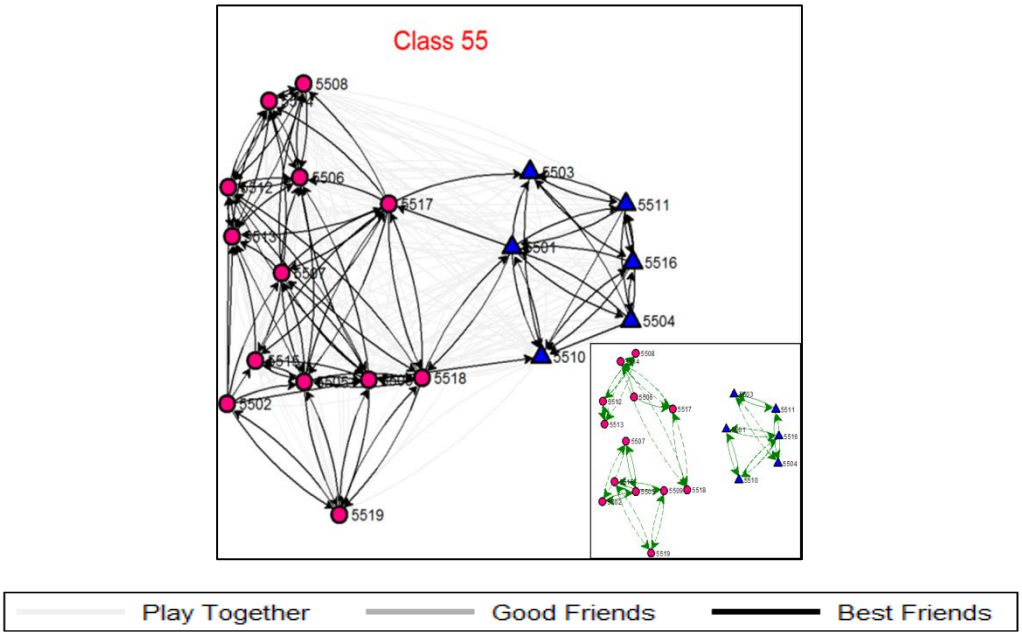


Fig. S7: Representation of 19 classroom-networks. Modern Multidimensional Scaling has been used to visualize space-distances only between best friends (5). Black, grey and light-grey lines correspond to values 5 (Best Friends), 4 (Good Friends) and 3 (Sometimes Play Together) of the friendship questionnaire respectively. Blue triangles correspond to boys and pink circles to girls. In the Social rewards schemes, green dashed lines show the induced interactions between students according to the instructions of the respective condition.

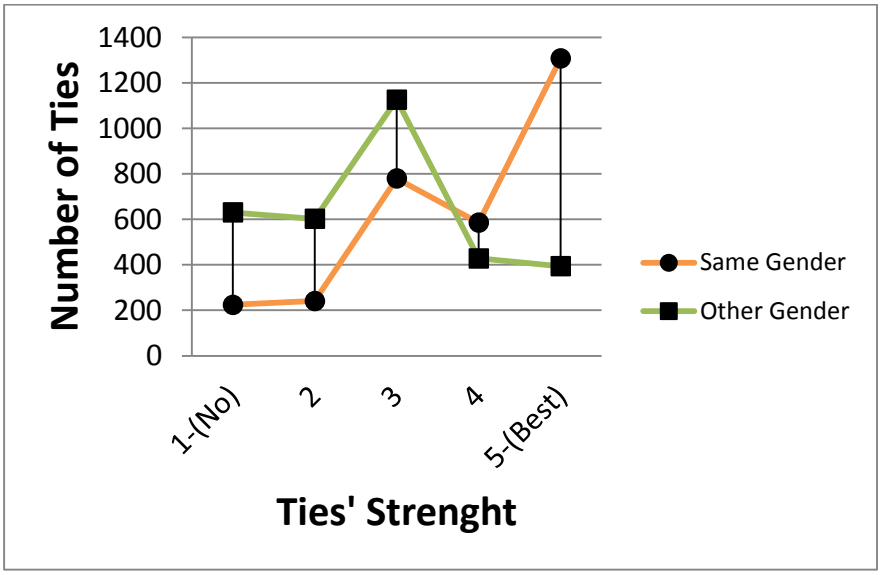
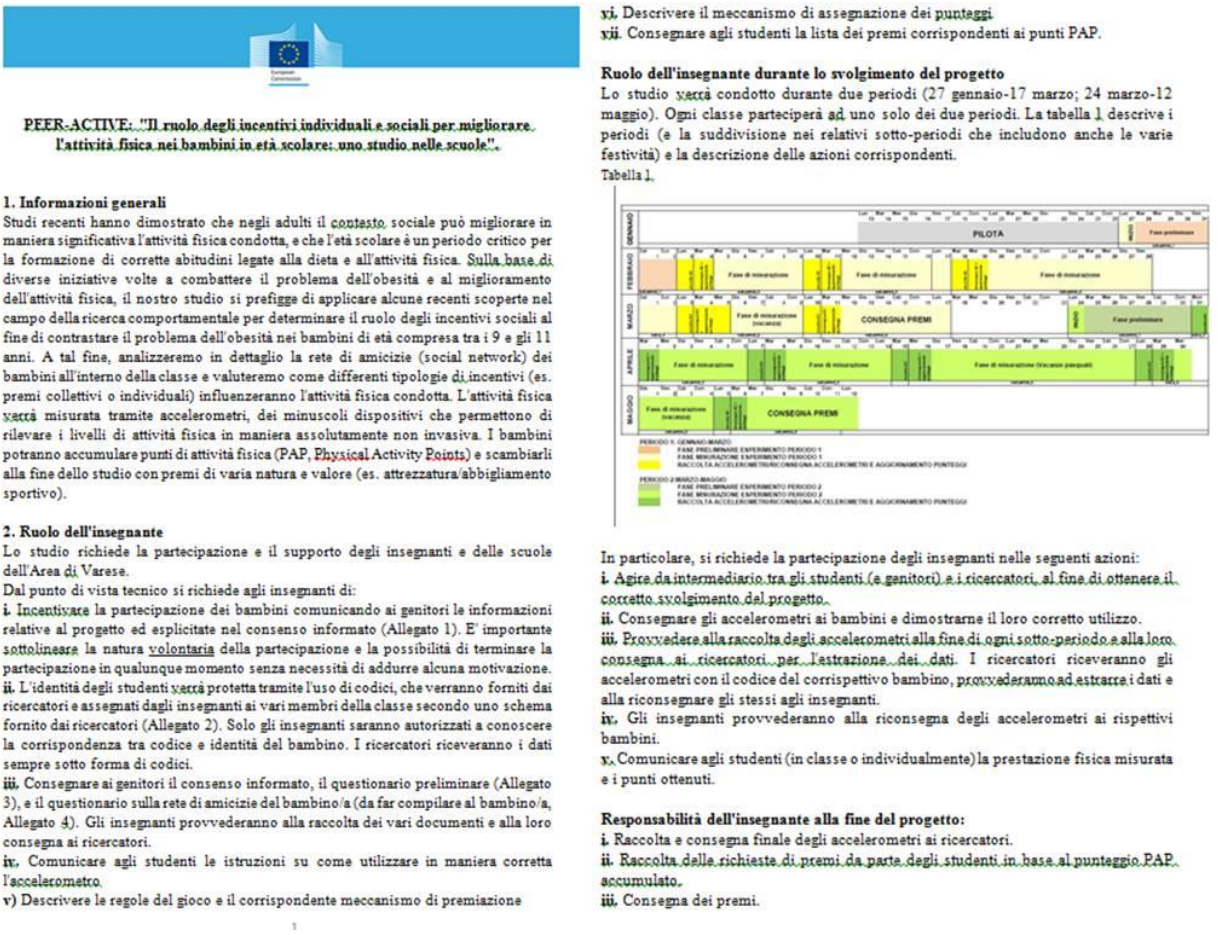


Fig. S8: Sex Homophily. Number of friendships by ties' strength and sex concurrence. A child is 3 times more likely to have a best friend of the same sex. On the other hand, a child is at least 2.5 times more likely to have no (tie=1) or little (tie=2) friends of the opposite sex. The low value of the E-I-index (43) for best friendships (E-I(5): -0.54) and the high values for no or little friendships (E-I(2):0.43, E-I(1):0.48) confirm the presence of sex homophily.



PEER-ACTIVE: "Il ruolo degli incentivi individuali e sociali per migliorare l'attività fisica nei bambini in età scolare: uno studio nelle scuole".

1. Informazioni generali

Studi recenti hanno dimostrato che negli adulti il contesto sociale può migliorare in maniera significativa l'attività fisica condotta, e che l'età scolare è un periodo critico per la formazione di corrette abitudini legate alla dieta e all'attività fisica. Sulla base di diverse iniziative volte a combattere il problema dell'obesità e al miglioramento dell'attività fisica, il nostro studio si prefigge di applicare alcune recenti scoperte nel campo della ricerca comportamentale per determinare il ruolo degli incentivi sociali al fine di contrastare il problema dell'obesità nei bambini di età compresa tra i 9 e gli 11 anni. A tal fine, analizzeremo in dettaglio la rete di amicizie (social network) dei bambini all'interno della classe e valuteremo come differenti tipologie di incentivi (es. premi collettivi o individuali) influenzeranno l'attività fisica condotta. L'attività fisica verrà misurata tramite accelerometri, dei minuscoli dispositivi che permettono di rilevare i livelli di attività fisica in maniera assolutamente non invasiva. I bambini potranno accumulare punti di attività fisica (PAP, Physical Activity Points) e scambiarli alla fine dello studio con premi di varia natura e valore (es. attrezzatura/abbigliamento sportivo).

2. Ruolo dell'insegnante

Lo studio richiede la partecipazione e il supporto degli insegnanti e delle scuole dell'Area di Varese.

Dal punto di vista tecnico si richiede agli insegnanti di:

i. Incentivare la partecipazione dei bambini comunicando ai genitori le informazioni relative al progetto ed esplicitate nel consenso informato (Allegato 1). E' importante sottolineare la natura volontaria della partecipazione e la possibilità di terminare la partecipazione in qualunque momento senza necessità di addurre alcuna motivazione.

ii. L'identità degli studenti verrà protetta tramite l'uso di codici, che verranno forniti dai ricercatori e assegnati dagli insegnanti ai vari membri della classe secondo uno schema fornito dai ricercatori (Allegato 2). Solo gli insegnanti saranno autorizzati a conoscere la corrispondenza tra codice e identità del bambino. I ricercatori riceveranno i dati sempre sotto forma di codici.

iii. Consegnare ai genitori il consenso informato, il questionario preliminare (Allegato 3), e il questionario sulla rete di amicizie del bambino/a (da far compilare al bambino/a, Allegato 4). Gli insegnanti provvederanno alla raccolta dei vari documenti e alla loro consegna ai ricercatori.

iv. Comunicare agli studenti le istruzioni su come utilizzare in maniera corretta l'accelerometro.

v) Descrivere le regole del gioco e il corrispondente meccanismo di premiazione

vi. Descrivere il meccanismo di assegnazione dei punteggi.

vii. Consegnare agli studenti la lista dei premi corrispondenti ai punti PAP.

Ruolo dell'insegnante durante lo svolgimento del progetto

Lo studio verrà condotto durante due periodi (27 gennaio-17 marzo; 24 marzo-12 maggio). Ogni classe parteciperà ad uno solo dei due periodi. La tabella 1 descrive i periodi (e la suddivisione nei relativi sotto-periodi che includono anche le varie festività) e la descrizione delle azioni corrispondenti.

Tabella 1.

In particolare, si richiede la partecipazione degli insegnanti nelle seguenti azioni:

i. Agire da intermediario tra gli studenti (e genitori) e i ricercatori, al fine di ottenere il corretto svolgimento del progetto.

ii. Consegnare gli accelerometri ai bambini e dimostrarne il loro corretto utilizzo.

iii. Provvedere alla raccolta degli accelerometri alla fine di ogni sotto-periodo e alla loro consegna ai ricercatori per l'estrazione dei dati. I ricercatori riceveranno gli accelerometri con il codice del corrispettivo bambino, provvederanno ad estrarre i dati e alla riconsegnare gli stessi agli insegnanti.

iv. Gli insegnanti provvederanno alla riconsegna degli accelerometri ai rispettivi bambini.

v. Comunicare agli studenti (in classe o individualmente) la prestazione fisica misurata e i punti ottenuti.

Responsabilità dell'insegnante alla fine del progetto:

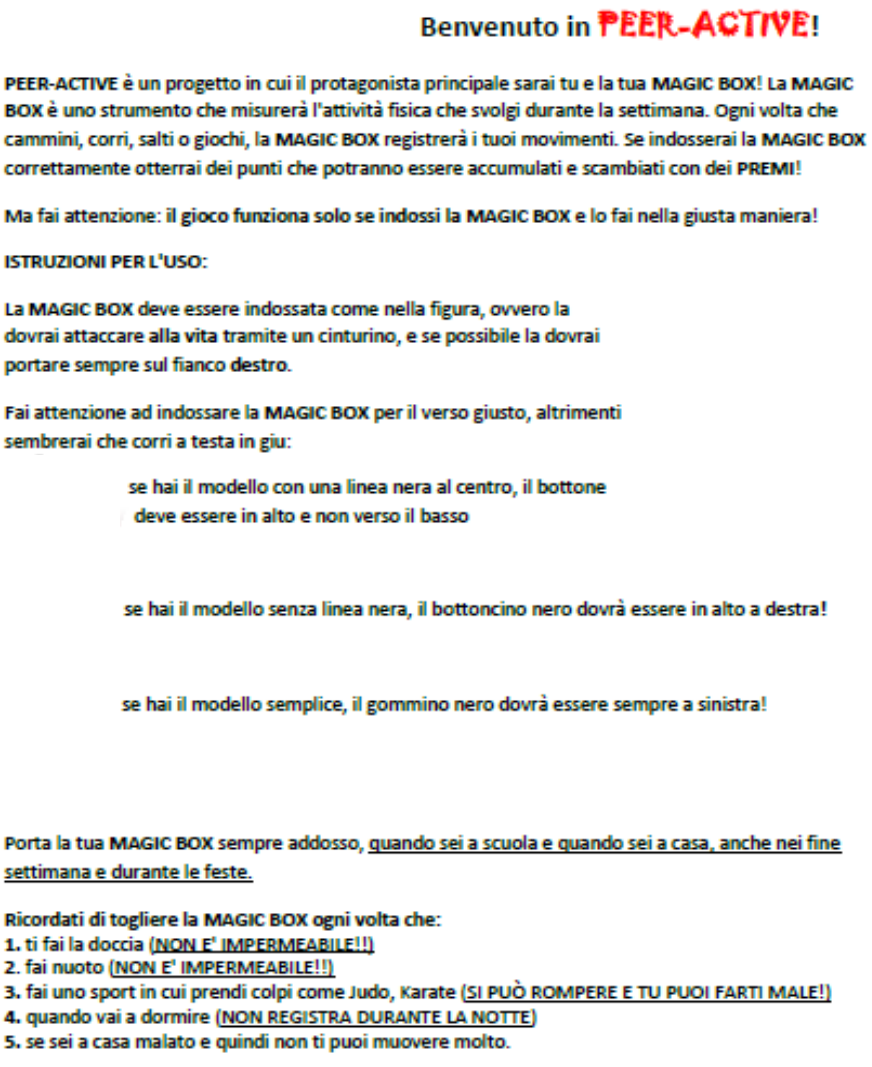
i. Raccolta e consegna finale degli accelerometri ai ricercatori.

ii. Raccolta delle richieste di premi da parte degli studenti in base al punteggio PAP accumulato.

iii. Consegna dei premi.

Fig S9: Teachers' General Instructions.

Translation: **PEER-ACTIVE: "The role of individual and social incentives to improve physical activity in school-age children: a study in schools".** 1. General information:/ Recent studies have shown that in adults, social context can significantly improve physical activity, and that school age is a critical period for the formation of correct habits related to diet and physical activity. Based on several initiatives aimed at tackling the problem of obesity and improving physical activity, our study aims to apply insights from behavioral research to understand the role of social incentives tackling the problem of obesity in children aged 9- 11. To this end, we will analyze in detail the friendships network (social networks) of children within the class and we will evaluate how different types of incentives (e.g. collective or individual) will influence physical activity. Physical activity will be measured by accelerometers, tiny devices that allow the detection of levels of physical activity in an absolutely non-invasive way. Children will accumulate physical activity points (PAP, Physical Activity Points) and exchange them at the end of the study with rewards (e.g. equipment / sportswear)./ 2. Teacher role:/ The study requires the participation and support of the teachers and schools of the Varese area./ From a technical point of view, teachers are required to:/ i. Encourage children participation by informing parents about the project as explained in the informed consent (Annex 1). It is important to highlight the voluntary nature of participation and the possibility of ceasing participation at any time without the need to state any reason./ ii. Students identity will be protected through the use of codes, which will be provided by the researchers and assigned by the teachers to the various members of the class according to a scheme provided by the researchers (Annex 2). Only teachers will be allowed to know the correspondence between the child's code and identity. Researchers will always receive data in the form of codes./ iii. Give parents the informed consent, the preliminary questionnaire (Annex 3), and the questionnaire on the child's friendship network (to be completed by the child, Annex 4). The teachers will be in charge for the collection of the documents and their delivery to researchers./ iv. Communicate instructions to students on how to use the accelerometer correctly/ v) Describe the rules of the game and the corresponding reward mechanism/ vi) Describe the scoring mechanism/ vii. Give students the list of prizes corresponding to the PAP points./ 3. Role of the teacher during the project:/ The study will be conducted during two periods (27 January-17 March, 24 March-12 May). Each class will participate in only one of the two periods. Table 1 describes the periods (and the subdivision in the related sub-periods which also include the various holidays) and the description of the corresponding actions./ In particular, teacher participation is required in the following actions:/ i. Acting as an intermediary between students (and parents) and researchers, in order to get the project carried out correctly./ ii. Deliver the accelerometers to the children and demonstrate their correct use./ iii. Be in charge of accelerometers pickup at the end of each sub-period and their delivery to researchers for data extraction. The researchers will receive the accelerometers with the code of the corresponding child, extract the data and return it to the teachers./ iv. Teachers will be in charge of accelerometers delivery to the children./ v. Communicate to students (in class or individually) the measured physical performance and the points obtained./ Responsibility of the teacher at the end of the project:/ i. Pickup and final delivery of accelerometers to researchers./ ii. Delivery of rewards based on the students' accumulated PAP score.



Benvenuto in PEER-ACTIVE!

PEER-ACTIVE è un progetto in cui il protagonista principale sarai tu e la tua **MAGIC BOX**! La **MAGIC BOX** è uno strumento che misurerà l'attività fisica che svolgi durante la settimana. Ogni volta che cammini, corri, salti o giochi, la **MAGIC BOX** registrerà i tuoi movimenti. Se indosserai la **MAGIC BOX** correttamente otterrai dei punti che potranno essere accumulati e scambiati con dei **PREMI**!

Ma fai attenzione: il gioco funziona solo se indossi la MAGIC BOX e lo fai nella giusta maniera!

ISTRUZIONI PER L'USO:

La **MAGIC BOX** deve essere indossata come nella figura, ovvero la dovrai attaccare alla vita tramite un cinturino, e se possibile la dovrai portare sempre sul fianco destro.

Fai attenzione ad indossare la **MAGIC BOX** per il verso giusto, altrimenti sembrerai che corri a testa in giu:

se hai il modello con una linea nera al centro, il bottone deve essere in alto e non verso il basso

se hai il modello senza linea nera, il bottoncino nero dovrà essere in alto a destra!

se hai il modello semplice, il gommino nero dovrà essere sempre a sinistra!

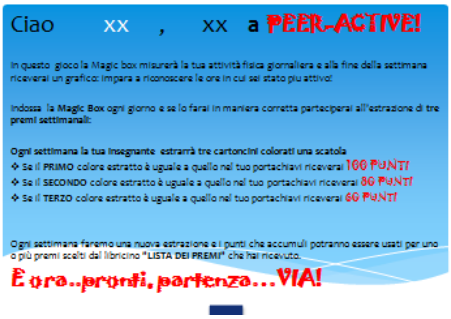
Porta la tua **MAGIC BOX** sempre addosso, quando sei a scuola e quando sei a casa, anche nei fine settimana e durante le feste.

Ricordati di togliere la MAGIC BOX ogni volta che:
1. ti fai la doccia (NON E' IMPERMEABILE!!)
2. fai nuoto (NON E' IMPERMEABILE!!)
3. fai uno sport in cui prendi colpi come Judo, Karate (SI PUÒ ROMPERE E TU PUOI FARTI MALE!)
4. quando vai a dormire (NON REGISTRA DURANTE LA NOTTE)
5. se sei a casa malato e quindi non ti puoi muovere molto.

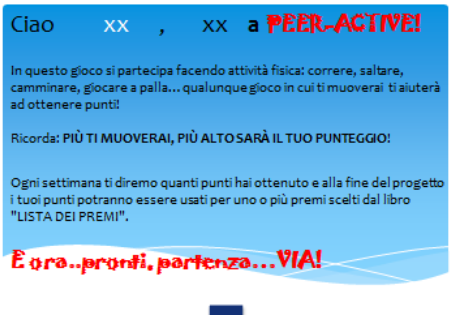
Fig. S10: Introductory instructions for correct accelerometer use.

Translation: Welcome to Peer Active/ Peer Active is a project in which the main actor is you and your Magic Box! The Magic box is an instrument that will measure the physical activity performed during the week. Every time you walk, run, jump or play, the Magic Box will record your movements. If worn correctly, you will earn points that will be accumulated and then exchanged with rewards!/ Bear in mind: the game works only if you wear the Magic Box correctly. /Instructions /The Magic box has to be worn as in the picture, attached to your waist with the provided belt, and if possible always on the right side/ Make sure to wear it upwards, as indicated by the pictures below/ Always wear your Magic box, when you are at school and at home, also during weekends and during holidays/ Remember to take it off every time you:/ 1. take a shower/ 2. Swim/ 3. play a type of sport where you hit or take hits such as Judo, Karate as it can break/ 4. when you go to sleep/ 5. when you are home sick and as result, you cannot move much

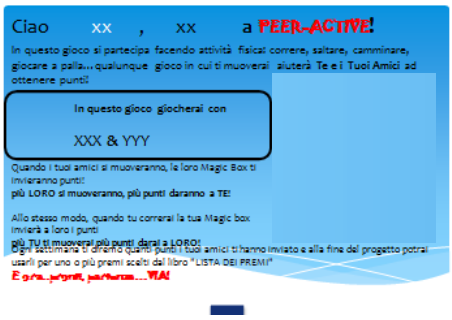
A) Control (Random) Scheme



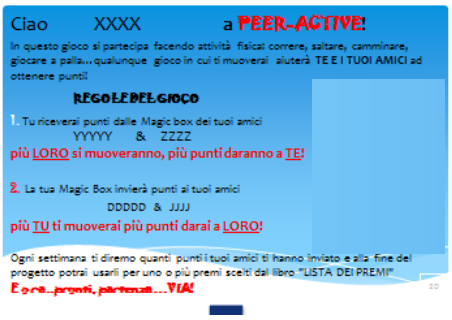
B) Individual rewards Scheme



C) Direct Reciprocity Scheme



D) Indirect Reciprocity Scheme



E) Team Scheme

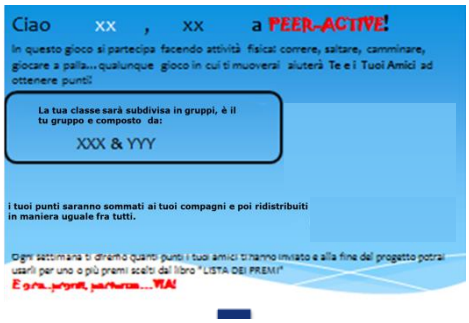


Fig. S11: Incentive instructions and close-friends matching across different intervention schemes (A-E). XXX corresponds to the first name of the receiver of the information while YYY, ZZZ, DDD, JJJ to the first names of the close-friends matched/grouped with the receiver (where applicable).

Translation: A) In this game the Magic box will measure your physical activity and at the end of the week you will receive a graph: learn how to identify the hours in which you have been more active!/ Wear the Magic box every day and if done correctly, you will participate in a lottery with the opportunity to win 3 weekly prizes:/ Every week your teacher will draw 3 color cards from a box/ If the first color extracted is the same as the one of your key holder you will receive 100 points/ If the second color extracted is the same as the one of your key holder you will receive 80 points/ If the third color extracted is the same as the one of your key holder you will receive 60 points/ Every week we will draw a new lottery and you can use the accumulated points to choose one or more rewards from the booklet "Reward list" received at the beginning of the project.
B-E) i) Common introductory message: You will participate in this game by doing physical activity: running, jumping, walking, ball playing.. whichever game you play will help you [C,D,E: and your friends] to earn points. ii) Common final message: Every week we will tell you how many points you earned [C,D,E: your friends have sent you], and at the end of the project your points will be exchanged for one or more rewards from the booklet "Reward list" received at the beginning of the project./
B) Remember: the more you move, the higher will be your score/ Every week we will tell you how many points you earned, and at the end of the project your points will be exchanged for one or more rewards from the booklet "Reward list" received at the beginning of the project./
C) In this game you will play together with xxx & yyy/ Whenever your friends will move, their Magic Box will send you points/ The more they move, the more points you get./ In the same way, whenever you move, your Magic Box will send points to your friends/ the more you move, the more points you send/
D) Rules/ 1. You will receive points from your friends XXX and YYY Magic boxes/ The more they move, the more points you get/ 2. Your Magic box will send points to your friends DDD & JJJ/ the more you move, the more points you send
E) Your class will be divided in groups, and your group is composed by you YYY and ZZZ./ Your points will be added to those of your team members and then shared equally among all of you.

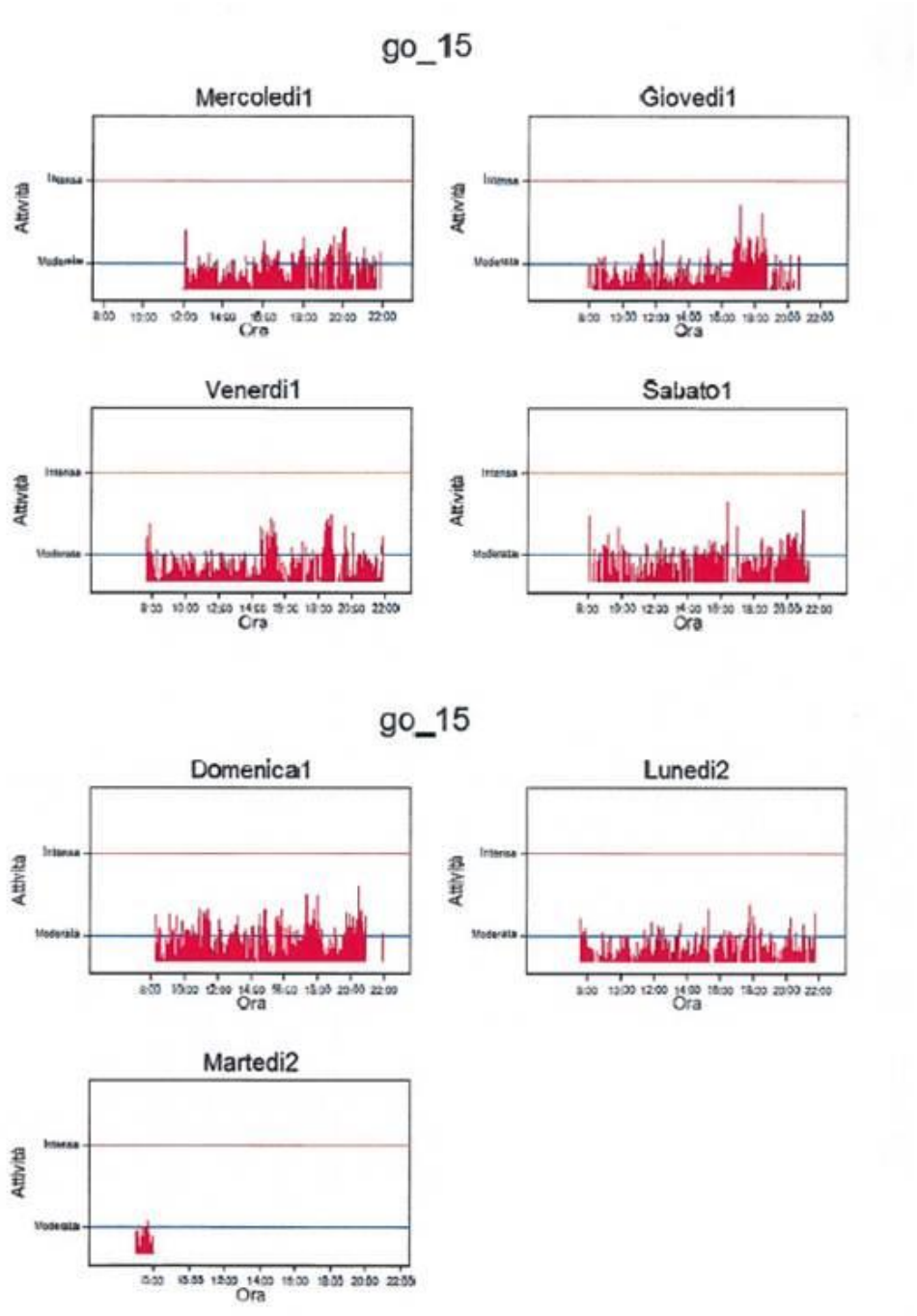
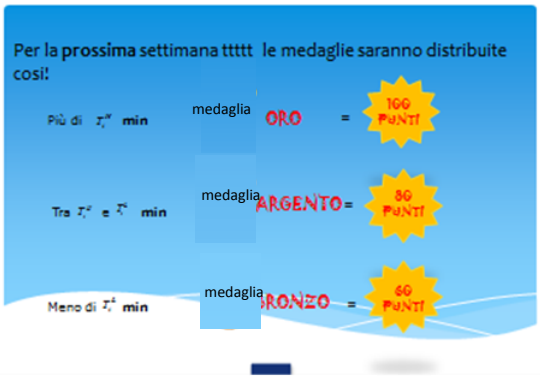


Fig. S12: Individual feedback on hourly activity level for 1-week experimental period.

A) Control (Random) Scheme

B) Individual Rewards Scheme



C) Direct Reciprocity Scheme

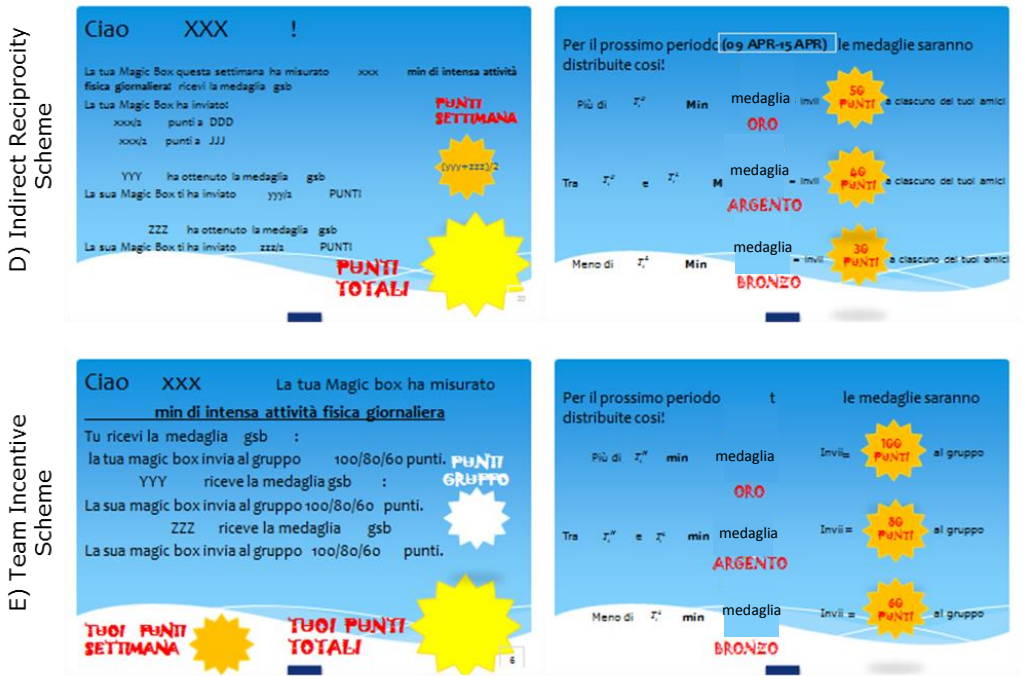


Fig. S13: Individual feedback information for all $p_{t\geq 1}$ periods across different intervention schemes (A-E). XXX corresponds to the first name of the receiver of the information while YYY, ZZZ, DDD, JJJ to the first names of the close-friends matched/grouped with the receiver. GSB corresponds to the initial letters of Golden, Silver or Bronze medal which could potentially obtained by participants.

Translation: A-E: This week your Magic Box has measured tttt min of intense daily physical activity
B-E: i) You received a gsb medal
A: Lottery/ If the first colour extracted is the same as the one of your key holder you will receive 100 points./ If the second colour extracted is the same as the one of your key holder you will receive 80 points./ If the third color extracted is the same as the one of your key holder you will receive 60 points./ Write down how many points you won this week and then calculate the total amount of points
B-E: Final message: For the next week the medals will be so distributed:/ for more than xx min Golden Medal (corresponding to 100 points)/ between yy and xx Silver Medal (corresponding to 80 points)/ less than yyy Bronze medal (corresponding to 60 points)
C: Your Magic box has sent xxx/2 points to DDD and xxx/2 points to JJJ./ JJJ has obtained a gsb medal./ His/her Magic box has sent you jjj/2 points./ DDD has obtained a gsb medal./ His/her Magic box has sent you ddd/2 points
D: Your Magic box has sent xxx/2 points to DDD and xxx/2 points to JJJ./ YYY has obtained a gsb medal./ His/her Magic box has sent you yyy/2 points./ ZZZ has obtained a gsb medal./ His/her Magic box has sent you zzz/2 points
E: Your Magic box has sent 100/80/60 points to the group./ YYY has obtained a gsb medal./ His/her Magic box has sent 100/80/60 points to the group./ ZZZ has obtained a gsb medal./ His/her Magic box has sent 100/80/60 points to the group

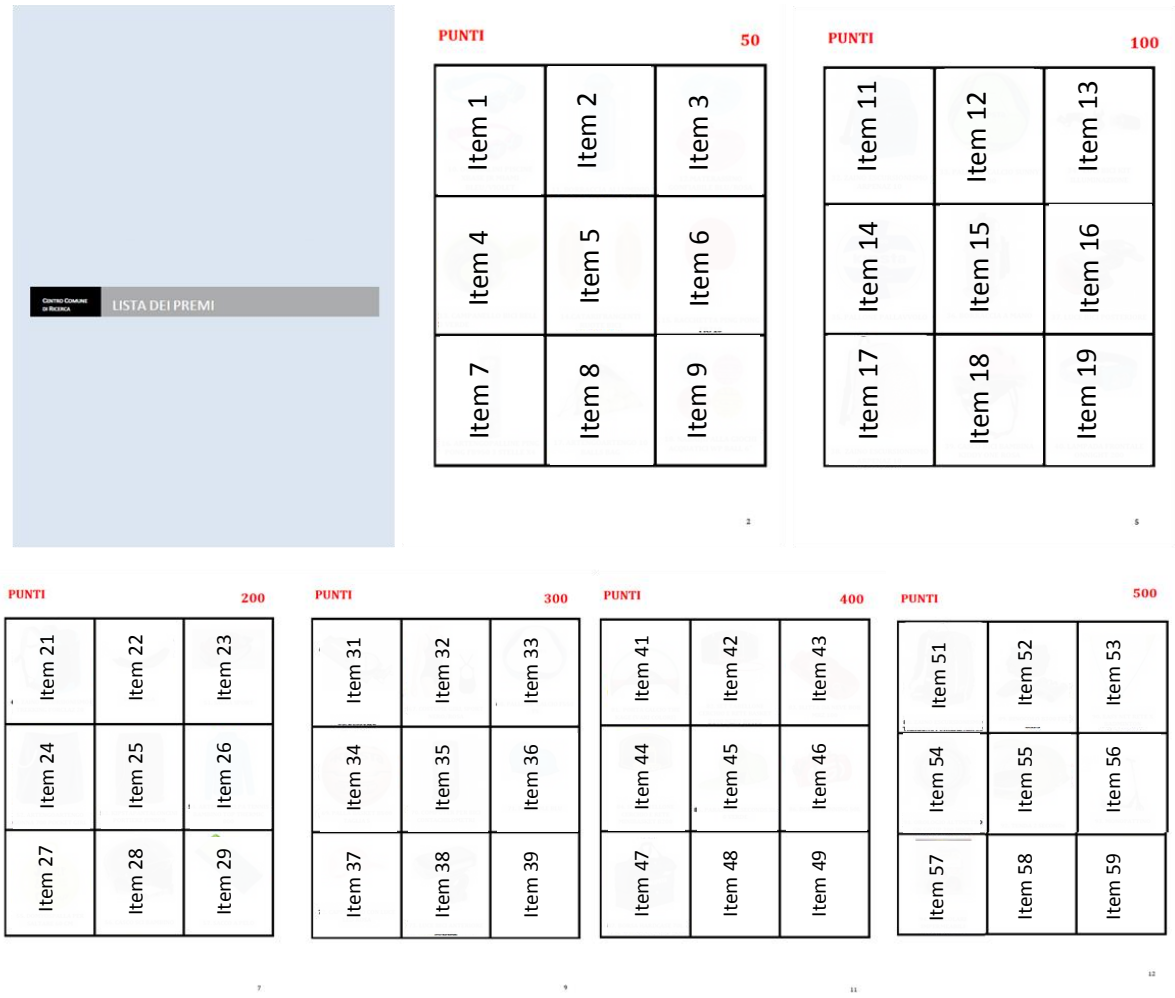


Fig. S14 : Gift-list sample. The complete gift-list (available upon request) includes 94 different items expressed in points: 17 50-points items, 17 100-points items, 15 200-points items, 14 300-points items, 7 400-points items, 7 500-points items. The list was constructed by the researchers based on the web price list of the item merchandiser. The true values of the items in euros (before tax) were about the 1/10 of the point-values in the list and they were never revealed to the participants. In the end of the experiment students could choose from the list item(s) of total value equal to the points they had earned during the experiment. If the earned points could not round the total amount of any items combination, the remaining points from all students were transferred to a common school-class budget which was spent on item(s) from the same list and remained in the classroom.

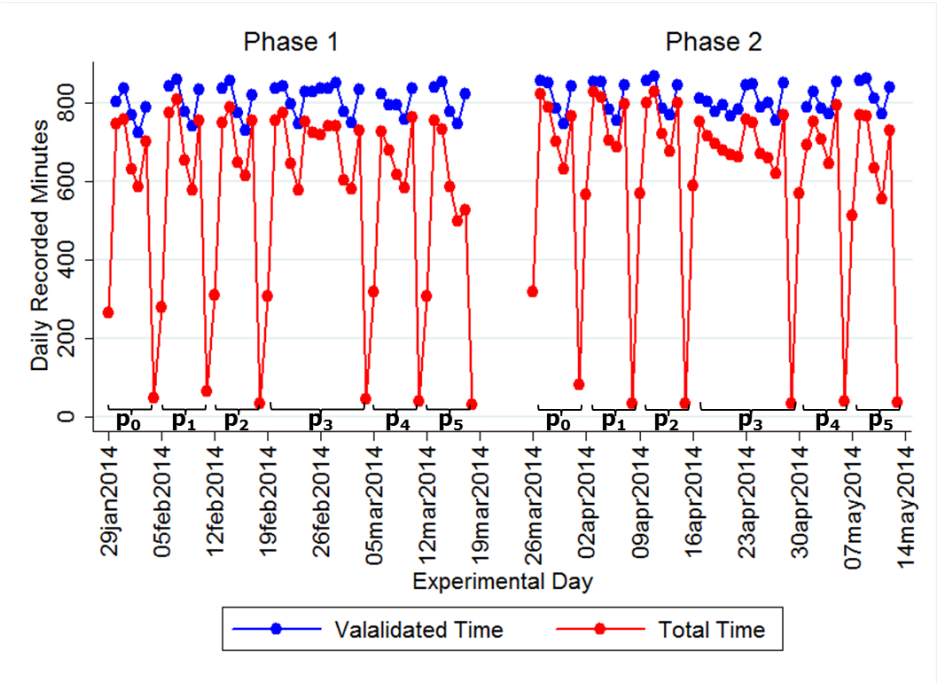


Fig. S15: Average Daily Recorded Minutes. Validated time: Data before 07:00 and after 23:00 were excluded and non-wear time was removed. The additional filter for all those subjects who had less than 10 validated hours, removed all accelerometers' delivery and recollection days.

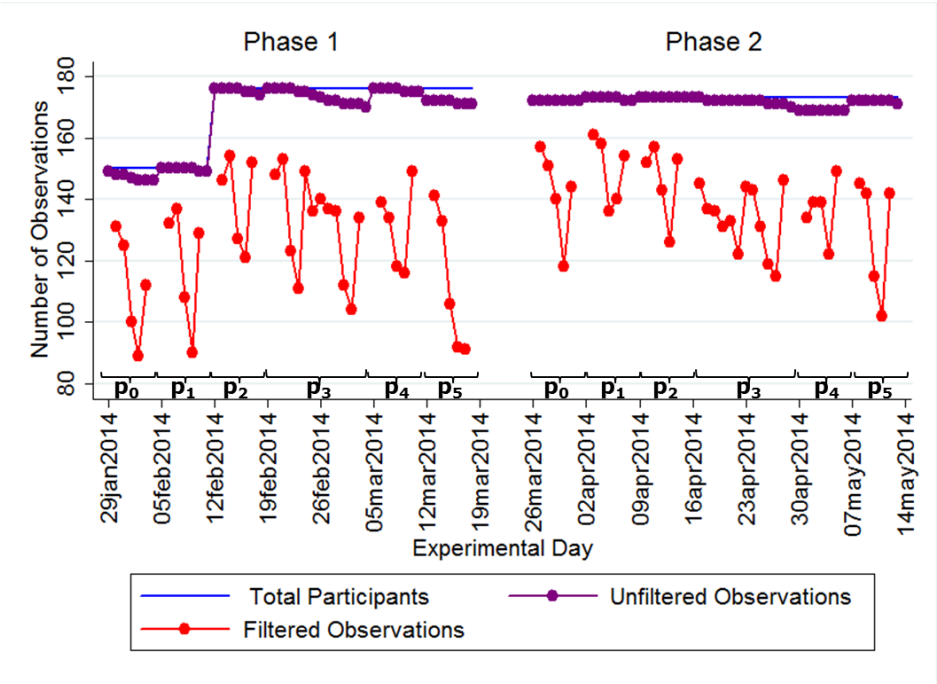


Fig. S16: Average Daily Recorded Minutes. The total number of participants in phase 1 and 2 was 176 and 173 respectively. However, in phase 1, two classes (26 students) joined the study only in the beginning of p_2, due to technical problems.

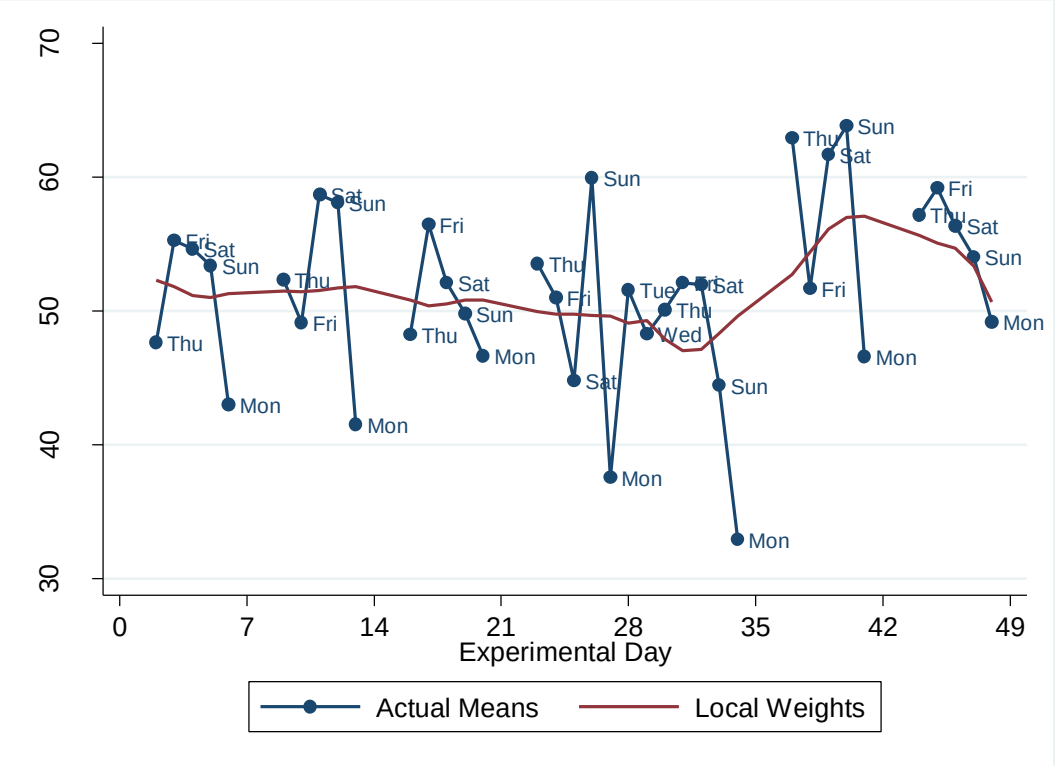


Fig. S17: Moderate-Vigorous Physical Activity (MVPA), pooled data. Local weights is referring to locally (with 0.3 bandwidth) weighted regression of MVPA on experimental days. Centered subsets of 0.3*N observations are used for calculating smoothed values for each point in the data except for end points, where smaller, uncentered subsets are used.

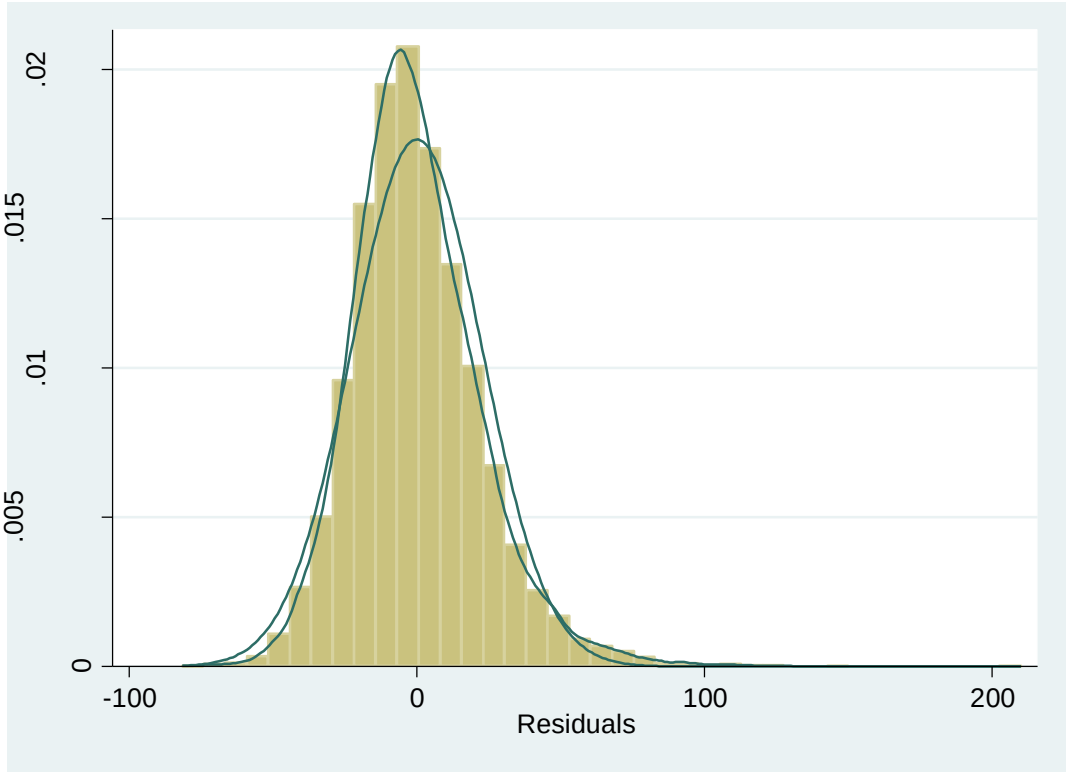


Fig. S18: Residuals distribution: Histogram, kdensity and (theoretical) normal distributions. As compared to the normal distribution, the distribution of our residuals is slightly skewed on the left (0.83) and leptokurtic (5.56).

Supplementary Tables

Table S1: Descriptive Statistics of Accelerometers' Recorded Time						
Hours	Observations (Days)	Days per individual	Mean (minutes)	Std. Dev. (minutes)	Min (minutes)	Max (minutes)
Total (basic filter)[1]	16218	46.5	590.2975	318.238	0	1021
Validated (strict filter)[2]	9776	28	814.4153	92.54247	600	1021
Validated (broad filter)[3]	11135	32	772.4973	149.5024	300.17	1021
Notes: 1. Data before 07:00 and after 23:00 were excluded and non-wear time was removed. 2. Additional filter excluding those days who had less than 10 validated hours. 3. Additional filter including days who had more than 5 validated hours during accelerometers delivery day.						

Table S2: Descriptive Statistics by Experimental Phase and Condition							
Incentive Schemes (conditions)		Control (random)	Individual Rewards	Direct Reciprocity	Indirect Reciprocity	Team Rewards	Total/ Averages*
Total	Classes	4	4	3	3	5	19/3.8*
	Females	40	42	23	31	41	177/35.4*
	Males	36	45	27	30[a]	34	172/34.4*
	Av. Valid Days/indiv.	28.4	29.5	30.8	28.2	24.3[b]	28.1*
	Av. Valid Minutes/day	806	823	810	816	815	814*
Phase 1	Classes	2	2	1	2	3	10/2*
	Females	20	25	8	18	21	92/18.4*
	Males	18	24	5	19	18	84/16.8*
	Av. Valid Days/indiv.	27.3	28.7	29.9	26.1	22[b]	26.5*
	Av. Valid Minutes/day	802	819	809	813	808	810*
Phase 2	Classes	2	2	2	1	2	9/1.8*
	Females	20	17	15	13	20	85/17*
	Males	18	21	22	11[a]	16	88/19.25*
	Av. Valid Days/indiv.	29.5	30.5	31.1	31.6	26.7	29.8*
	Av. Valid Minutes/day	809	828	810	819	821	817*

Notes: a. Including a student whose data was never validated. b. Values are reduced due to late participation (after p_1) of two classes (26 students).

		Table S3: Bilateral Mann-Whitney tests (z-scores) between experimental conditions						
		Incentive Schemes	N	Control	Individual Rewards	Direct Reciprocity	Indirect Reciprocity	Team Rewards
MALES	**Pooled**	Control	36	NO	-0.998	-2.319*	0.567	-3.220**
		Individual Rew.	45			-1.553	1.379	-2.624**
		Direct Recip.	27				2.501*	-0.639
		Indirect Recip.	29					-3.310***
		Team Rew.	34					NO
	Phase 1	Control	18	NO	-0.051	-0.820	0.486	-2.689**
		Individual Rew.	24			-0.577	0.514	-2.542*
		Direct Recip.	5				0.675	-1.118
		Indirect Recip.	19					-2.522*
		Team Rew.	18					NO
	Phase 2	Control	18	NO	-1.127	-1.604	0.240	-2.139*
		Individual Rew.	21			-0.632	1.606	-1.502
		Direct Recip.	22				1.423	-0.946
		Indirect Recip.	10					-1.897
		Team Rew.	16					NO
FEMALES	**Pooled**	Control	40	NO	-2.653**	-3.697***	-3.026**	-1.993*
		Individual Rew.	42			-1.495	-0.893	0.847
		Direct Recip.	23				-0.813	2.176*
		Indirect Recip.	31					1.495
		Team Rew.	41					NO
	Phase 1	Control	20	NO	-0.434	-2.288*	-2.017*	-1.669
		Individual Rew.	25			-2.184*	-1.871	-1.489
		Direct Recip.	8				0.333	0.830
		Indirect Recip.	18					0.423
		Team Rew.	21					NO
	Phase 2	Control	20	NO	-3.627***	-2.833**	-2.247*	-1.244
		Individual Rew.	17			0.850	0.774	3.200**
		Direct Recip.	15				0.668	2.133*
		Indirect Recip.	13					1.658
		Team Rew.	20					NO
	Notes: ***, ** and * correspond to less than 0.1%, 1% and 5% significance level. Red font highlights results which are consistently significant in both phases.							

Table S4:Multilevel Regression Models on MVPA

			(M41)	(M42)	(M43)	(M44)
FIXED EFFECTS Coefficients	**Conditions**	Individual Rew.	2.320 (1.430)	2.399 (1.423)	2.324 (1.358)	2.296 (1.366)
		Indirect Recip.	2.477 (1.578)	2.473 (1.568)	2.687 (1.435)	
		Direct Recip.	4.281** (1.638)	4.218** (1.630)	4.303** (1.661)	3.808** (1.177)
		Team Rewards	4.763** (1.565)	4.818** (1.554)	4.932** (1.503)	
	Controls	Female	-14.06*** (1.615)	-14.27*** (2.470)	-13.64*** (2.330)	-14.34*** (2.473)
		Valid time	0.0450*** (0.0032)	0.0449*** (0.0032)	0.0465*** (0.0031)	0.0449*** (0.0031)
		Time-Dummies+	[-9.2, 34.7] ([2.8, 3.6])	[-9.2, 34.9] ([2.8, 3.5])	[-9.3, 33.5] ([2.8, 3.5])	[-9.5, 34.4] ([2.6, 3.4])
		Constant	6.332 (3.569)	6.780 (3.722)	7.014* (3.576)	7.351* (3.616)
RANDOM EFFECTS Variances	**Level 3**	Var(Class)	3.337 (5.073)	27.281 (17.9.41)	27.640 (17.912)	31.953 (19.211)
		Var(female)		68.776 (38.166)	69.712 (38.129)	69.572 (38.149)
		Cov(fem, class)		-41.194 (24.990)	-41.719 (23.363)	-44.388 (25.837)
	L2	Var(Child)	203.037 (17.352)	187.003 (16.570)	184.717 (16.461)	184.942 (16.498)
		Var(Residuals)	526.482 (7.668)	526.456 (7.667)		
		Var(19-Resid)#			[313, 816] ([20.2,52.2])	[313, 816] ([20.2,52.2])
Model Statistics		Observations	9776	9776	9776	9776
		Wald χ^2	1996.4	1952.4	2063.2	2057.4
		p_{value}	0.0001	0.0001	0.0001	0.0001
		Log likelihood	-44926.2	-44921.5	-44786.1	-44787.1
		AIC	90018.4	90013.0	89778.2	89776.1
		BIC	90615.0	90623.9	90518.5	90502.1

Notes: Minutes of Moderate to Vigorous Physical Activity (MVPA) is the dependent variable in all models. Standard errors (s.e.) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. + coefficient and s.e. values-interval for the 73 time-dummies. # (co)-variance and s.e. values-interval for the 19-class residuals. AIC and BIC correspond to Akaike and Bayesian Information Criteria respectively.

Table S5:Multilevel Regression Models on MVPA

			(M51)	(M52)	(M53)	(M54)	(M55)	(M56)
					Females		Males	
FIXED EFFECTS Coefficients	**Conditions**	Individual Rew. (IV)	1.851 (1.664)	1.798 (1.680)	1.361 (1.708)	1.302 (1.716)	3.325 (2.087)	3.286 (2.125)
		Indirect Recip. (IR)	2.116 (1.866)	4.375** (1.416)	1.989 (1.758)	1.538 (1.381)	3.133 (2.289)	5.886** (1.918)
		Direct Recip. (DR)	3.467 (2.105)		4.212* (2.049)		4.909 (2.554)	
		Team Rewards (TE)	8.772*** (2.115)		-0.128 (1.682)		11.20*** (2.539)	
		female	-13.79*** (2.384)	-14.11*** (2.542)				
	Interactions	IV*fem	1.028 (2.014)	1.037 (2.021)				
		IR*fem	1.079 (2.232)	-1.029 (1.448)				
		DR*fem	1.973 (2.831)					
		TE*fem	-6.243* (2.456)					
		Constant	6.671 (3.541)	7.244* (3.625)	8.284* (4.138)	8.126 (4.179)	-7.147 (5.101)	-6.291 (5.190)
Wald Tests	**Summation**	IV+IV*fem χ^2	2.83	2.72				
		p_{value}	0.0924	0.0988				
		IR+IR*fem χ^2	3.27	6.15*				
		p_{value}	0.0706	0.0132				
		DR+DR*fem χ^2	5.82*					
		p_{value}	0.0159					
		TE+TE*fem χ^2	2.02					
		p_{value}	0.1555					
Observations			9776	9776	4956	4956	4820	4820
Wald χ^2			2078.1	2059.0	838.4	833.2	1277.0	1260.8
$p_{value<}$			0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Log likelihood			-44782.4	-44786.7	-21830.1	-21832.2	-22593.3	-22597.9
AIC			89778.8	89779.4	43860.2	43860.4	45386.6	45391.9
BIC			90547.9	90519.7	44511.1	44498.2	46034.7	46027.0

Notes: Minutes of Moderate to Vigorous Physical Activity (MVPA) is the dependent variable in all models. Standard errors (s.e.) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Control (valid time, date) variables, random effects parameters and residuals as described in eq.6, are eventually omitted from the table for facilitating illustration. AIC and BIC correspond to Akaike and Bayesian Information Criteria respectively.

Table S6: Correlations between MVPA and different weather measurements					
	MVPA	Temperature	Wind speed	Pressure	Precipitation
MVPA	1.0000				
Temperature	0.6169**	1.0000			
Wind speed	0.2464*	0.3109**	1.0000		
Pressure	0.3446**	0.0615	-0.0213	1.0000	
Precipitation	-0.6889**	-0.4789**	0.0914	-0.4357**	1.0000

Notes: ** and * correspond to 1% and 5% significance level. Data have been downloaded by the website "Weather Underground" with the measurements collected from the meteorological station located in Bessozo, Varese. http://italian.wunderground.com/cgi-bin/findweather/hdfForecast?query=45.846%2C8.667&sp=IVARESEB6

Table S7:Multilevel Regression Models on post experimental MVPA

			(M71)	(M72)
FIXED EFFECTS Coefficients	**Conditions**	Individual Rew.	-7.718***	-7.574**
			(1.998)	(2.445)
		Indirect Recip.	-2.052	1.264
			(2.159)	(2.478)
		Direct Recip.	-4.202	-0.177
			(2.437)	(2.868)
		Team Rewards	-5.835**	-0.844
			(2.143)	(2.722)
	Controls	Female	-14.48***	-13.64***
			(2.496)	(2.697)
		Valid time	0.0428***	0.0512***
			(0.00332)	(0.00603)
		Constant	18.61***	0.943
			(3.941)	(5.491)
Model Statistics		Observations	8509	2476
		Wald χ^2	1766.1	531.3
		p_{value}	0.0001	0.0001
		Log likelihood	-39068.9	-11445.2
		AIC	78323.7	22988.4
		BIC	78979.3	23273.3

Notes: Minutes of Moderate to Vigorous Physical Activity in the post experimental period ($MVPA_{post}$) is the dependent variable in all models compared with all experimental periods (p_1-p_4) in M71 and with the pre-experimental period (p_0) in M72. Standard errors (s.e.) in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. + Four different dummies, one for each different condition (IV-individual, DI-Direct Reciprocity, IND-Indirect reciprocity, TE-Team rewards) are included in the fixed part of the model. Control (valid time, date) variables, random effects parameters and residuals as described in eq.1, are omitted from the table for facilitating illustration. AIC and BIC correspond to Akaike and Bayesian Information Criteria respectively.

Supplementary Notes

Environmental effects

Children's physical activity was significantly higher during late-weekdays and weekends (Thursday-Sunday) than early-weekdays (Monday-Wednesday) (M-W: z_{late} = -7.831, p_{value}<0.001), with the highest weekly performances during Friday-Sunday (black triangles correspond to Saturdays in fig.3) and the lowest Mondays (black dots in fig. 3, see also fig. S17). Different weather conditions had an impact on MVPA (table S6). In fig. 3 blue-shadowed periods indicate precipitation more than 5mm, while yellow shadows highlight temperature higher than 10°C. Warm (rainy) days had a positive (negative) significant effect on average MVPA (M-W: z_{warm}= -4.374 (z_{rainy}= 6.158), p_{value}<0.001). A weakly significant (M-W: $z_{holiday}$=-2.052, p_{value}=0.0402) positive effect of holidays (green shadow) on MVPA was detected, but only for dry days. Interestingly, during rainy days, the effect of holidays is reversed (and marginally no-significant due to low number of observations (n=4), M-W: $z_{holiday}$=1.795, p_{value}=0.0726). This may be due to restricted access in indoor activities during holidays. Environmental factors had an impact on boys' MVPA only, which was significantly higher (M-W; z_{phase}= -4.119, p_{value}<0.001) in the second experimental phase. Girls' improvement (M-W; z_{phase}= -1.588, p_{value}=0.112) was not significant, suggesting that boys may be more engaged in more outdoor activities than girls.

Network Analysis

We tested for differences in the main network characteristics of the 19 classrooms. We could not reject the hypothesis (p_{value}>0.131) of the non-parametric test that all samples were drawn from populations with the same median (Md) with respect to density[$t_{ij\geq3}$]: Md=0.74, SD=0.11; in-centrality($t_{ij\geq3}$): Md= 0.21, SD=0.08; out-centrality($t_{ij\geq3}$): Md= 0.27, SD=0.10; transitivity($t_{ij\geq3}$)): Md= 0.55, SD=0.18; and reciprocity($t_{ij\geq3}$): Md= 0.72, SD=0.08. Moreover, the above network

characteristics were all insignificant when introduced in our basic model and they were eventually omitted from our regression analysis. We also tested for significant differences in the networks of only best friends and found no significant differences in their respective medians: density[$t_{ij=5}$]: Md=0.27, SD=0.09; in-centrality($t_{ij=5}$): Md= 0.28, SD=0.08; out-centrality($t_{ij=5}$): Md= 0.33, SD=0.11; transitivity($t_{ij=5}$)): Md= 0.53, SD=0.33; and reciprocity($t_{ij=5}$): Md= 0.41, SD=0.08.

Testing differences between boys' and girls' networks we found some significant results including sex homophily which was calculated with the E-I-index[37]. The Krackhardt E/I Ratio (EI-index = (E - I) / (E + I)) is a social network measure of the relative density of internal connections within a social group compared to the number of connections that group has to the external world, where I (internal) is the number of ties within a social group G and E is the number of ties to the external world (outside of group G). We found strong evidence on sex homophily (E-I-index(τ_{ij}=5)= -.54***, indicating more same-sex friends and E-I Index (for each $\tau ij \geq 3$)= 0.18*** indicating more different-sex no-good/best friends.

There was no significant difference between boys and girls in the friendship measure (MW:$z_{out\text{-}degree}$ =-0.661, p_{value}=0.5085). Moreover both boys and girls evaluated same-sex (M-W: z_{out_same}=1.432, p_{value}=0.15209) and opposite-sex friends (M-W: z_{out_other} = -1.250, p_{value}=0.2114) in the same way. However both sexes evaluated same-sex friends significantly higher than opposite-sex friends (Wilcoxon tests: z_{out_males}=-10.644 $z_{out\_females}$=10.477, z_{out_both}=14.914, $p_{value} \leq 0.0001$). This observation also confirmed our sex homophily finding, also documented in other studies[5,6].

Boys had a more central role both in the overall classroom network (MW: $z_{closeness(\tau_{ij=5})}$= 2.196, p_{value}=0.0281) and in the within-sex network (MW: $z_{closeness(\tau_{ij=5})}$= 3.796, p_{value}=0.0001, $z_{closeness(\tau_{ij \geq 4})}$= 2.842, p_{value}=0.0045). This finding was also confirmed when using only reciprocal relationships both in overall classroom network (MW: $z_{closeness(\tau_{ij}+\tau_{ji \geq 9})}$= 2.082, p_{value}=0.0374) and in

the within-sex networks (M-W: $z_{closeness(\tau_{ij}+\tau_{ji}=10)}$= 1.698, p_{value}=0.0896, $z_{closeness(\tau_{ij}+\tau_{ji}\geq 9)}$= 3.63, p_{value}=0.0003, $z_{closeness(\tau_{ij}+\tau_{ji}\geq 8)}$= 2.272, p_{value}=0.0231).

Boys were more frequently characterized as good-best friends (MW: $z_{in\text{-}degree(\tau_{ij}\geq 4)}$= 2.165, p_{value}=0.0304) in the overall network. However, this difference did not persist when comparing same-sex good-best friends. This means that boys are "better" friends due to the fact that girls see them as good-best friends.

Girls were more frequently characterized as no (M-W; $z_{in\text{-}degree,(\tau_{ij}=1)}$= -3.759, p_{value}=0.0002) or little (MW: $z_{in\text{-}degree,(\ \tau_{ij<=2)}}$ = -2.455, p_{value}=0.0141) friend by their classmates. This result also remained in the within-sex networks (M-W; $z_{in\text{-}degree(\tau_{ij}=1)}$=- 2.628, p_{value}=0.0086; $z_{in\text{-}degree(\tau_{ij}=2)}$=- 2.016, p_{value}=0.0438; $z_{in\text{-}degree(\tau_{ij}=3)}$=- 2.185, p_{value}=0.0289) which means that boys are not responsible for these negative scores.

Finally, girls' best friendships were significantly more reciprocal to same-sex friends than boys $z_{reciprocity(\tau_{ij}=5)=}$-2.254 p_{value}=0.0242.

Supplementary Methods

Regression Model

For t=1…74 first level measurements within i=1…349 individuals (second level group) who are nested within j=1…19 classrooms (third level group) the model is:

$$MVPA_{jit} = \beta X_{jit} + u_j + u_{ji} + E_{jit} \quad (1)$$

The fixed part is described as follows:

$$\beta X_{jit} = \beta_0 + \beta_1 IV_j + \beta_2 IND_j + \beta_3 DI_j + \beta_4 TE_j + \beta_5 fem_i + \beta_6 val\_time_{it} + \sum_{\tau=2}^{74} \beta_{\tau+5} Dum_t \quad (2)$$

The X_{jit} can also be seen as a matrix with 74 row-dimension (number of observations in lowest level) and 80 column-dimension (number of regressors).

The random part of the model contained:

a. The third-level random effects include a random intercept and a random coefficient part: $u_j = u_{0j} + u_{1j} * fem_{jt}$ (3) with $u_j \sim N(0, \Sigma_3)$ and a general symmetric covariance matrix

$$\Sigma_3 = Var \begin{bmatrix} u_{0j} \\ u_{1j} \end{bmatrix} = \begin{bmatrix} \sigma_{u0}^2 & Cov(u_0, u_{1)} \\ Cov(u_0, u_{1)} & \sigma_{u1}^2 \end{bmatrix}$$

b. The second-level random effects which simply includes a random intercepts $v_{0ji}(4)$ with variance $v_{0ji} \sim N(0, \sigma_u^2 I)$.

c. In the first-level, we account for heteroskedastic residual errors in classroom level. That is $\forall j$: $\varepsilon_{jit} \sim N(0, \sigma_{\varepsilon j}^2 I)$, so that $E_{jit} = \sum_{j=1}^{19} \varepsilon_{jit}$ (5)

The extended form of equation (1) therefore was:

$$MVPA_{jit} = \beta_0 + \beta_1 IV_j + \beta_2 DI_j + \beta_3 IND_j + \beta_4 TE_j + \beta_5 fem_i + \beta_6 val\_time_{it} + \sum_{t=2}^{74} \beta_{t+5} Dum_t + u_{0j} + u_{1j} * fem_{jt} + v_{0ji} + E_{jit} \quad (6)$$

The results of this equation are reported in the first column of table 1. The positive and highly significant effects of TE, DI and Social-Incentives (DI+IND+TE, in column 2, table 1) have also been replicated in a random-effects (using the Generalized Least Squares estimator) regression model (not shown here), with id being the level-2 variable. In this model, we controlled for the 19-different classes in the fixed part of the model by including 18 class-dummies (-1, control group) while we accounted for class-heteroskedasticity by allowing for intragroup correlation in the standard errors.

$$MVPA_{jit} = \delta_0 + \delta_1 IV_j + \delta_2 DI_j + \delta_3 IND_j + \delta_4 TE_j + \delta_{105} IV_j fem_i + \delta_{205} DI_j fem_i + \delta_{305} IND_j fem_i + \delta_{405} TE_j fem_i + \delta_5 fem_i + \delta_6 val\_time_{it} + \sum_{t=2}^{74} \delta_{t+5} Dum_t + u_{0j} + u_{1j} * fem_{jt} + v_{0ji} + E_{jit} \quad (7)$$

Equation 7 adds the interactions between gender and each treatment condition separately. Columns 3 and 4 in table 1 reports main coefficients (with corresponding standard errors) and also the χ^2 and the p_{value} of different Wald tests corresponding to the sum of two different coefficients.

Post-hoc Testing and Diagnostics

An alternative model including an additional fourth no-nested level for time has also been tested (not shown here) but performed worse than including simple dummies (Akaike information Criteria (AIC): 90187.58 and Bayesian information Criteria (BIC): 90266.64, to be compared with the corresponding values in model 1 in supplementary table S4, henceforth S4M1).

A log-likelihood ratio test comparing the two nested-models without and with (see supplementary table S4, columns M41 and M42 respectively) the gender random coefficient resulted significant (LR χ^2=9.42 and prob>χ^2 =0.009). We additionally tested this last model (M42) against a model accounting for gender-heteroskedasticity in class-level but we found no significant results (LR χ^2=2.61 and prob>χ^2 =0.106).

We also allowed for random effects in level-3 to be correlated (general symmetric covariance matrix). as they resulted in a significantly lower log-likelihood value as compared to a model (not shown here) with independent (diagonal matrix) covariance (LR χ^2=6.43 prob>χ^2=0.0112).

In level-2 random effect we tested for different model specifications by adding either one or two random gender coefficients (for accounting for gender heteroskedasticity) but neither specification improved our model as measured by Akaike's and Bayesian information criteria. Finally we accounted for heteroskedasticity by classroom in the measurements-level (see supplementary table S4, column M43). A log-likelihood ratio test again confirms that heteroskedastic residuals improved the performance of our model (LR χ^2=270.79; prob >χ^2<0.0001).

Post-experimental results

To isolate and analyse the post experimental effect, we repeated our regression analysis by comparing MVPA of the post experimental period (p5, henceforth $MVPA_{post}$) with the MVPA a) from all experimental periods (p1-p4, henceforth $MVPA_{exp}$), shown in column M71 of supplementary table S7 b) from the baseline period p_0 before subjects receive any incentives (henceforth $MVPA_{pre}$) shown in column M71 of supplementary table S7. Interactions between sex and the different treatment was not found significant in any regression and was therefore not included in this analysis and in table S7.

a) We found that the $MVPA_{post}$ was significantly lower than $MVPA_{exp}$ only in individual and in team rewards schemes. $MVPA_{post}$ in direct and indirect reciprocity schemes were not significantly different to $MVPA_{exp}$.

b) We found that while MVPA in all social incentives came back to their initial levels (i.e. no significant differences between $MVPA_{post}$ and $MVPA_{pre}$), interestingly, the MVPApost in individual scheme was significantly lower than the corresponding $MVPA_{pre}$. Of course, this result does not mean that the individual incentive had a negative overall effect but it shows that participants in the begging of the study are probably very enthusiastic and over-reactive. For the same reason, students in social incentive schemes probably "come back" to an initial level which is higher than their usual level. We touch this issue in the penultimate paragraph of discussion when we talk about Hawthorne (reactivity) effect and perform the corresponding robustness test.

Robustness Tests

As robustness check we repeated our regression analysis (columns M61, M62 in table S6) using (a) an alternative activity-time classification, based on the cut-points suggested by Freedson and colleagues (*43*, *44*) and (b) a less conservative filter which includes those accelerometers-delivery days (Wednesdays) with at least 5 hours (1359 additional observations) of valid wear time. In both cases, our gender findings were confirmed. In particular, in M61 males in the team rewards scheme increase their MVPA by 10.085 min./day (p_{value}=0.008), while females in the direct reciprocity scheme by 7.08 additional min./day (p_{value}=0.0078).

In M62 males' performance reached the same high levels in the team rewards scheme (8.166 MVPA min./day as compared to the control), while females' MVPA in the direct reciprocity scheme was considerably better, with 8.68 additional min./day as compared to control condition. In the same

sample, the individual scheme appeared to have a significant (at 5%) positive effect, but for girls only.

As another robustness check in table S6 (column M63), we repeated the analysis using only the data collected during the third period of the experiment, since in this period (a) subjects are already engaged in the study for 3 weeks (b) there is no end-of-game effect and (c) it lasts for 2 consecutive weeks (with no feedback or researcher contact). Although weaker, due to the loss of statistical power, the main results hold; males are more susceptible to team rewards (p_{value}= 0.016) and females to direct reciprocity (p_{value}= 0.0037). Additionally, in this period, direct reciprocity was significant also for boys (p_{value}= 0.017) while for girls indirect reciprocity also turned significant (p_{value}= 0.0243).

Finally, although we control indirectly for the initial PA levels (by design due to random allocation of students in the different conditions and statistically by using the information of p_0 as a control period), we repeated the analysis by including a control variable of the initial physical activity (in PA) which was generated under the following two strong assumptions (to minimise the number of missing values): a) we use the average MVPA of the entire first week (no matter how many observations and at which days) b) if no valid information was collected during the first week, we took the average of the second week, so on so forth. The main sex-specific findings were reproduced also in this case: males are more susceptible to team rewards (p_{value}= 0.004) and females to direct reciprocity (p_{value}= 0.0164), see table S6 column M64.

Supplementary References

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